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Inharmonious Cusp Relation—*Ward*

Artificial Dentures Occasionally Disappoint Us—*Snow*

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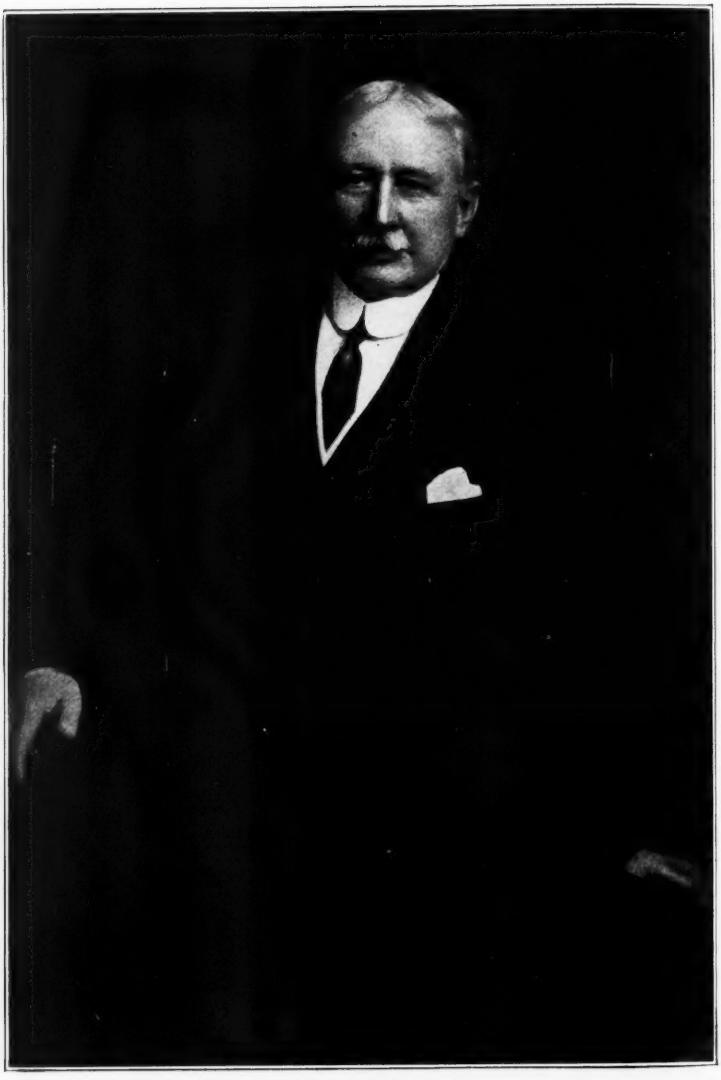

CALVIN S. CASE, M.D., D.D.S., F.A.C.D., Chicago, Illinois
1847-1923

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Original Communications

PREVENTION OF CARCINOMA OF THE MOUTH

By VILRAY P. BLAIR, M.D., F.A.C.S., St. Louis, Missouri

(Read before the Chicago Dental Society, January 18-20, 1923)

FIFTY per cent or more of all carcinoma of the face and mouth could be eliminated in the precancerous stage. The lesions I refer to chiefly, are on the skin—warts, moles or dark rough patches which may take on rapid growth or ulcerate. Such places in the face or upper lip may be let alone until they show signs of increased activity. Then they should be dealt with efficiently. In the mouth any wart appearing after forty years of age, any fissure or ulcer in the cancer age that will not heal quickly under proper treatment, or any ulcer, fissure, wart, increased thickening or induration appearing in a leucoplakia, or the "nicotine blister", should be regarded with the gravest suspicion. Better still it is an excellent rule to remove each and every one of them first and then consider the diagnosis afterwards, for at that time the operative death rate will be nil and the permanent cures will approximate close to one hundred per cent. With regard to cancer producing role of trauma in the mouth, I am not so thoroughly convinced. Animal experimentation and clinical observation show that repeated trauma including heat burns and certain chemicals predispose to, or form growths resembling cancer, but within the mouth the relation of the rough or dirty tooth to a cancerous ulcer is, I believe, more often accidental than causative, this in spite of the fact that cancer of the lower lip is not infrequently immediately preceded by an acute injury.

The frequency with which carcinomata arise on the gingivae of the lower teeth is strongly suggestive that the irritation of the callus may be a factor directly or indirectly responsible for the occurrence of the cancer here. I would make

a distinction between irritation of callus and trauma of a rough tooth.

The dentist carries a peculiar responsibility in regard to these early lesions. It is during the period of life where the teeth are most apt to demand attention, that lesions, known to the precursors of cancers are most apt to arise. The habit of making a quick observation of all the exposed skin and mucous membrane will frequently give the dentist an opportunity of giving timely advice of life-saving value in regard to them. As a lecturer to dental classes it has been a sincere satisfaction to me that for years as many or more precancerous lesions and very early cancers have been referred to me by dentists than by physicians. That the dentists' good advice is not always followed, nor that it is not always supported by the physician may be discouraging, but this does not lessen its validity nor in the long run its utility. The victim of such non-cooperation on the part of the medical man is later going to speak his mind forcefully and impress upon many the advisability of following the safer course. Most people are sensitive to any change occurring in the mucosa of the mouth and it is strange that many if not most carcinomata of the mouth are well developed and have attained some considerable size by the time they seek medical advice. After consulting the physician they may receive most inadequate treatment. To first treat it for syphilis and then to cut it out with a slight margin is still common practice. In this way the ideal time for proper treatment is most commonly missed which is a tragedy because early diagnosis is usually easy and on the average

Fig. 1a

Fig. 1b

Figs. 1a and 1b.—Pictures of a man fifty-three years of age, who in May, 1918 injured his right lower lip with a wire; bled and healed in a few days. Four months later a white blister appeared at site of injury. It was treated with iodin and then a salve; two weeks later it was treated, under a guarantee, with a black salve. Sometime later it was treated by carbolic acid and healed under this latter treatment until October, 1919 when it reappeared. He had more treatments of several kinds, and then a cancer cure which was very painful. When seen at the Barnes Hospital in April, 1920 the ulcer which involved the whole of the mucous border of the right lower lip extending onto the upper lip also extended onto the mucous membrane of the cheek for a distance of 15 mm. beyond the angle of the mouth.

The striped area shows the amount that was excised through the full thickness of the lip, cheek and chin, the excision being larger on the mucous surface than on the cutaneous. The submaxillary and submental glands were removed and repair was made by dissecting both cheeks from the mandible as far back as the angle, and turning the flap "a" from the upper lip into the defect of the lower lip on a pedicle that included the vermilion border of the lip and the coronary artery and vein. Figure 1b shows the condition as he appeared about six months later. When last heard from, somewhat recently, there was no return of the growth.

they respond early to well planned surgery.

Even among private patients, mostly people who sought medical advice soon after observing the lesion, sixty-four per cent were very far advanced or inoperable when they first came to me and I have done very radical operations upon about eighty per cent of this latter group because it is difficult to pick the incurable cases and any procedure that gives a fighting chance is justifiable. The other side of the picture is one hundred per cent deaths in the worst form known, but very few ever metastasize below the clavicle. The mortality for these late cases range around twenty-five per cent or over, while in the hands of the better operators three per cent might represent the death rate from radical operations for the earlier cases.

Our mortality from operations on these cases has been high, something under twenty-five per cent but the procedure is justified by the fact that of those severe cases over three years ago and traced, fifty per cent are now alive and well. Routine blood transfusion at the time of operation is now very materially reducing this mortality.

This group is made up of combined involvements such as jaw, cheek and neck; tongue, jaw and pharynx; and floor, tongue, pharynx and larynx, growths with fixed or broken down neck glands, etc. A number of these were recurrent cases. No basal cell tumors, or growths requiring simple laryngectomy or simple amputation of tongue, or lip with gland resection are included in this series. A number had already been considered inoperable. Those that survived the first operation required from two to ten operations before it was considered the greatest removal and best repair had been completed.

All our well-established cases of tongue cancer are by choice operated by the suprahyoid approach by which the whole tongue, floor of the mouth and glands, parts of fauces palate or pharynx can be removed in one mass. This gives a higher death rate than the simple intraoral hemisection but permits of a much wider excision and strange as it may seem the speech results are better than after the hemisection. There is one physician on whom seven years ago I removed his whole tongue from the hyoid, for a recurrent carcinoma and he has ever since attended his practice and has a speech that is just a little "thick."

Fig. 2

Fig. 2.—Man forty-four years of age with a tremendous cancer of the cheek, lips and neck. In February, 1920 a fever blister appeared on left lower lip and no attention was given to it for nine months. He first received x-ray treatments, then radium, electric treatments and paste. The cancer continued to grow rapidly and in November, 1921 it appeared as shown in the photograph. This was probably not a very malignant tumor and at any time in the early stages it could have been cured by a comparatively simple operation or by a sufficient dose of radium.

Besides ignorance or selfish motive that might actuate a few, the two chief causes that account for failure to make

an early diagnosis are: first, a sentimental attitude that leads the physician to regard the lesion as non-malignant until it is proven cancer; second, a misinterpretation of the report of the microscopic findings. If the first consultant would regard every wart, every superficial induration and every persistent fissure or ulcer as cancer until proven otherwise and would regard with very grave suspicion, every negative microscopic diagnosis or diagnosis of "inflammatory tissues," then the whole chapter of cancer of the mouth could be rewritten in a very much more cheerful tone. Even worse than a failure of diagnosis is the treatment with irritants, insufficient radiation or inefficient operation. Just now an incalculable amount of harm is being done both to patients and to the therapeutic standing of radiation by the injudicious use of both radium and x-ray. Many a growth of comparatively mild malignancy is changed to extreme virulency and many an easily operable one is carried into the inoperable stage while undergoing treatment with rays of insufficient strength to favorably influence even those suited for radiotherapy. Cancer is best handled as one would treat a skunk—let it alone or kill it quick, only grief can come from irritating it.

In planning treatment or forming a prognosis, the age and size of the tumor, and the tissues involved should not form the sole basis of judgment. Some of the larger tumors are fenced around by and composed largely of inflammatory tissue that long retards gland infection; while some of the small shallow ulcers that look like abrasions of the mucosa are often the most deadly. Except in the upper jaw the primary growth does not early erode the bone, but the secondary growth in a lymph node, usually the buccal gland, will walk through the mandible like a smudge fire in a rotten log. In regard to time, certain growths were beyond

Fig. 3a Fig. 3b

Figs. 3a and 3b.—Man forty-three years of age who had an extensive recurrent cancer on the inner surface of the cheek and fauces. At the second operation the original scar, the whole of the cheek, the left fauces, the soft palate and a part of the pharynx were destroyed with the actual cautery. Fig. 3a shows the condition after it had scarred up and a pedicle flap taken from the neck had been transplanted between the jaws and onto the left half of the pharynx. The mouth is shown blocked open to its fullest extent by a tongue depressor placed between the incisor teeth.

Repair was completed by unfolding the pedicle of the flap for the lining of the cheek, giving the final result shown in Fig. 3b. It has now been over four years since the operation and he has had no return of the growth. He can open his mouth freely.

help two months after they were first noticed, while others seemed easily operable eighteen months after they first gave symptoms.

Recurrent pain radiating to the ear and vertex and the unexplained enlarged node in the adult should always be regarded with cancer suspicion. The primary lesion is not always easy to find. In one of my cases an immense carcinomatous mass in the neck was dependent upon a slight roughness of the uvula that was detected with the finger but hardly visible. Pharyngeal growths often go undetected. In another case a small ulcer on the anterior surface of the epiglottis remained undiscovered for four months after it was persistently sought for.

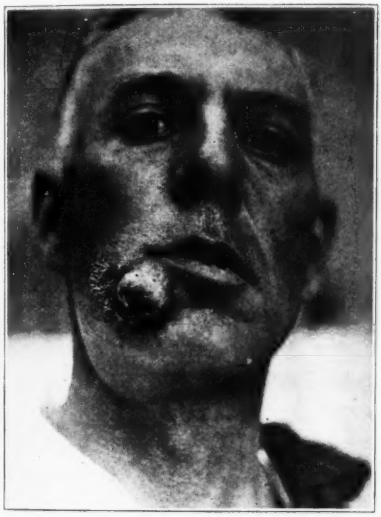

Fig. 4

Fig. 4.—Man forty-nine years of age, who in May, 1914 had two lower molar teeth removed because they were loose. Later it was noticed he had a small flat ulcer on the gum. This was excised and sent to one of the best pathological laboratories in the country and the answer came back "Stratified Epithelium does not show Carcinoma." This was somewhat naturally interpreted that the case was not carcinoma. Nitrate of silver was used on the ulcer which then began to grow rapidly, and in December, 1914 he presented the appearance shown in the photograph, with an extensive carcinoma of the cheek which had broken through. An extremely radical operation was done, but in spite of this the growth recurred within a year.

The interesting points about this case are: first, that a negative diagnosis was interpreted to mean that the case was not carcinoma; second, there is no doubt from the history that the cutting and the use of nitrate of silver stimulated a rather indolent ulcer into very active growth.

All associated lymph bearing areas should be removed in every case. I have not always done so but have not infrequent cause to regret it. I have seen gland infection become manifest eight years after the cure of the primary lip ulcer and a spontaneously cured lip ulcer followed four years later by a squamous epithelial infection of a corresponding lymph node.

Within the mouth I use a hot cutting cautery, in the neck knife and scissors dissection. Only on bone do I use the soldering iron and except to make a false joint after cauterizing the pharynx, I now rarely resect the jaw for carcinoma.

We have had some remarkable immediate results from radiation and as soon as x-ray or radium is proved to cure cancer of the mouth I will abandon mutilating operations, but if before that time I should be so unfortunate as to develop one on myself I will seek the man who will do the most radical operating.

Discussion

Thomas L. Gilmer, Chicago, Illinois: The Chicago Dental Society is deeply indebted to Dr. Blair for one of the best papers I have ever heard on this phase of the subject, cancer in the dentists' field of operation. I find myself in harmony with all that he has said. Ever since I have come in contact with dental students as a teacher, I have emphasized the importance of a better knowledge of mouth, face and jaw pathology. I have tried to impress students with the fact that they are responsible to their patients, not only for the condition of their teeth and gums, but as well for the whole or that part of the anatomy

they are supposed to care for. Dentists are giving far more attention to pathology of the mouth, not connected with the teeth, now than at any time in the past, indicated as Dr. Blair has said by their reference of cases. This has come about through better teaching and through the general awakening, resulting from agitation of the subject of cancer of the mouth.

Just what precancerous growths are, no one can definitely state, but it is safe to consider that all growths and abnormal conditions of the mouth either are, or may develop into cancer and when discovered, should be dealt with summarily. We must all cordially agree with Dr. Blair in the strong stand he has taken in this respect. Partsch of Breasleau long ago made the statement, in a resume of his experience in the study of neoplasms of the mouth and jaws, that ninety per cent of them belong either to the carcinomatous or sarcomatous group. This seems high. Perhaps what he meant was that they are, or may become cancerous. One might not go far wrong in saying that all new growths in the mouth should be considered malignant until definitely proven otherwise, and promptly attack them.

The term malignant, when associated with growths generally conveys the idea that they are of the kind which grow into and destroy normal adjacent tissues and produce metastasis, in more or less remote parts, such as do carcinoma and sarcoma. A benign growth, in the conventionally accepted meaning of that word, may cause death, not by infiltration of a normal tissue as does carcinoma, but by pressure absorption, and by the forcing of the normal tissues out of the way, involving important organs or parts, or by sepsis when such growths become infected and break down. Strictly speaking, such growths, in the common acceptance of that term, are not malignant but they certainly may be lethal and should be marked for removal for fear of such an eventuality.

The myeloid, or giant-celled sarcoma, is now classed as a benign growth, principally because it does not form metastases, but all know that it is most destructive of adjacent tissues and grows rapidly in some instances, and unless its progress is arrested by complete removal, it may as positively cause death as do those tumors classed as malignant.

Dr. Blair did not, I think, intend to convey the impression that all lesions, regardless, should at once be radically removed surgically, but he does emphasize the importance of correct diagnosis and prompt, early operation if indicated. There are certain secondary and tertiary syphilitic manifestations which require discrimination to differentiate from malignant growths. Mucous patches do not always run true to form and gumma of the tongue may be mistaken for a malignant growth, so also tubercular ulcers.

I may relate an experience I once had. A woman, about thirty-five years of age, was sent to me for the removal of a growth on the tongue which had been diagnosed as cancer by two well-informed physicians. It certainly looked like a malignant growth. There was no history obtainable of leuitic infection. It did not have the characteristic mouse-gnawed appearance of a tubercular ulcer. I was sufficiently impressed with the opinion of those who had sent the patient to me, and from the resemblance of the lesion to a malignant growth, to send the woman to the hospital for an operation to be performed early the next day. I was troubled about the appearance of that tongue, however, and when I went home at night, the picture of it was continually before me. Somehow, the diagnosis did not seem to fit the condition and the more I thought about it, the more unhappy I became at the thought of removing a part of the patient's tongue, thinking it cancer, to later find out that I had removed a gumma. I telephoned her physician and told him of my misgivings and suggested delay of the operation until I could obtain a Wasserman. He consented. The Wasserman was definitely positive. Under proper antisyphilitic treatment, the tongue got well. I have seen similar tongues which cleared up under the same treatment.

It is a well-known fact that occasionally one suffering from malignant growths in the mouth may give a positive Wasserman. It is not impossible that one may have carcinoma of the mouth and syphilis at the same time. It is common to find carcinoma implanted in leucoplakia patches in the mouth. I am often at a loss, I confess, to determine the best treatment of these white patches before they become warty and roughened, showing definite changes. I am inclined to the belief that there are two distinct kinds of leucoplakia, the one transitory, that is, it comes and remains for a few years or months and spontaneously disappears. It is less densely white than persistent variety. The transitory variety seems superficial and the epithelium remains soft, while in the persistent variety the epithelium becomes indurated and cornified. I have long since been impressed by clinical observation that these dense white leucoplakia patches frequently follow syphilis as a sequence and that carcinoma of the mouth is equally a sequence of leucoplakia.

If I am correct in my surmise that there are two distinct kinds of leucoplakia, then their treatment should be different. It is the dense white variety that chiefly concerns us. What shall be the treatment of it? Burn it

out with the electric cautery or cut it out, treating it as a precancerous growth, or keep it under observation and only operate when definite changes have been observed? Or shall we use radium or the x-ray? The irritation of either may be all that is necessary to cause the development of cancer.

A case recently came under my observation in which an attempt had been made to cure a leucoplakia by the use of radium, with the result that carcinoma followed. At the same time, the mandible on the side involved became necrotic from the excessive dosage of the radium. In another case, where radium was used for the treatment of a supposed sarcoma of the mandible, which was a cyst, necrosis of a part of the bone followed.

There is a difference of opinion as to the importance of always removing the lymph glands serving the locality involved, at the time of the operation. Dr. L. L. McArthur who has had the widest experience in the treatment of cancer, does not believe that it is desirable, neither does Dr. Blair. It is safest in most cases, to remove the lymph glands, but in the four cases of cured cancer I showed in my clinic, only one had the glands removed. These cases were definitely malignant, as indicated by the microscope; still they are well after three to fifteen years. In none of these cases were these palpable glands.

Dr. Blair is not inclined to stress the importance of local irritation as a factor in causing cancer of the mouth. It seems to me that it is generally given greater prominence as a causative factor in the human mouth than is justified unless the part irritated is in a leucoplakia patch. Since there is so much of irritation in the mouth which never becomes cancerous, and since careful observation does show that the supposedly offending tooth, bridge or plate could not have come in contact with the lesion in its incipiency, one is led to doubt if chronic irritation, when no leucoplakia is present, does play so important a role in causing mouth cancer as is supposed. Among the poor, women have many more defective, broken teeth than men, and they have less oral cancer.

It is common to hear that East Indians are very subject to cancer due to the universal habit of chewing the betel-nut. I read an interesting article a year or two ago, in one of the prominent medical journals, the author of which I have forgotten, I regret to say. He says that after a careful study of the subject, he did not find cancer so prevalent in the mouths of East Indians as is generally supposed. This writer also observed that women in East India as elsewhere, are much less subject to cancer of the mouth than are men. It was also stated that men, women and children universally chew the leaves of the betel-nut. May we not ask why, if chewing the betel-nut causes cancer in men, it does not also cause it in women, since they chew it also?

On general principles, however, I am strongly of the opinion that all sharp edges on teeth and artificial dentures should be removed, since they may cause an atrium through which the yet undiscovered cancer germ may find entrance into the tissues.

The secret of the cure of oral cancer lies in its early recognition and its complete eradication. If the growth is extensive when first seen by the surgeon, the lymph glands involved, and there is a cancer cachexia, then the prognosis is grave.

In conclusion, let me admonish the young men especially, that they have a great responsibility in connection with the problem of oral cancer. Let them remember that early recognition and complete removal of cancer and all precancerous growths will prevent and cure cancer of the mouth in the majority of cases.

William H. G. Logan, Chicago, Illinois: Since advice of the dental profession is not often sought when a patient is suffering from a malignant disease of the mouth or face, there are many important items in this problem that are not properly fixed in our minds. Therefore I have thought it would be at least interesting, and to a degree profitable, for us to review not only the cancerous but the precancerous lesions as they make their appearance in the mouth or on the face, that we may assist in reducing the fatalities from this source.

You will more thoroughly appreciate such a need when you have called to your mind that there are today in the United States between 290,000 and 300,000 individuals suffering from cancer who will die of that affliction within the next three years as follows: in the year of 1923, 90,000; in the year of 1924, nearly 100,000; in the year of 1925, a few over 100,000; and practically all of this last group are cancers that are just in their beginning and most all of them curable. This conclusion is reached on the basis that the average duration of the malignancy is three years, and out of each 100,000 deaths between 3,500 and 4,000 result from cancers of the skin; 4,000 present in the mouth and 9,000 in the breast, giving us a total of between 16,000 and 17,000 cases of cancer that practically all develop with a knowledge of the individuals that something abnormal has appeared and is spreading to new fields. As has often been said of those now living over forty-five years of age, more will die of cancer

than from any other single cause. One man out of thirteen past the age of forty and one woman out of every eight will succumb to cancer, and this percentage has been gradually increasing.

Having referred to the increased frequency of cancer, permit us to pass to some practical application to the point of assisting in reducing the number occurring in the mouth, jaws, tongue and upon the face. With this point in mind, let us approach the question, first, with the admission that we do not know the origin of cancer, yet during the last decade the element of chronic irritation has been accepted as of great importance in its origin. The more important precancerous lesions occurring upon the face are the pigmented moles. Chronic ulcers and fissures of the skin, without regard to their cause should be eradicated, for in such a base a cancer frequently develops. Carcinoma of the buccal mucous membranes has often been held to have been the sequence of chronic irritation, while other predisposing factors are found in syphilis, alcoholism and excessive use of tobacco.

With the foregoing picture in your minds, you should conclude that irritants in the form of dental appliances, sharp edges of cavities and root fragments should be avoided, by taking the steps necessary to eradicate them, and leucoplakia areas, or horny patches of mucous membrane when seen on the cheek caused, perhaps by holding tobacco in this location or the drawing of warm smoke through a pipe to a given area, the patient should be advised to discontinue this form of irritation. These pathologic precancerous lesions should be kept under observation if they are slight, and removed if indications seem to justify it—the point being that we can best reduce cancer fatalities by removing precancerous lesions. If the dentists as a profession would make it one of their impelling responsibilities to seek and have removed precancerous lesions, I am certain there would be a definite reduction in the death rate from this cause. If we permit precancerous lesions to remain and a cancer should develop and reach the point where it can be readily diagnosed clinically, there is but small chance for the patient to avoid death from the involvement. However, if a case of cancer of the lip, cheek or tongue presents, not in the early months, but in the early days of its involvement, there is a reasonable opportunity yet existing to save the life of your patient—particularly is this true if it is on the border of the lip or just the tip of the tongue, while cancer involving the side or base of the tongue, tonsil or antrum is always more serious.

In the consideration of cancer in any of these fields, we must have in mind the differential diagnosis of carcinoma, late syphilis, leucoplakia, tuberculosis and acinomycosis. Yet the purpose of this discussion is not only to stress differential diagnosis of these lesions but to urge the importance of always recognizing a deviation from normal in these structures, that the patient may have the benefit of your professional advice and seek relief before becoming afflicted with definite malignancy which may prove fatal. At the present time cancer may be said to be curable in the beginning in a majority of cases, but the beginning is definitely past when the structures are extensively involved and the glands in the field have become affected.

The late James B. Murphy laid down the five following laws having reference to the problem of cancer:

Law 1. Repeated mild traumata and irritations, particularly at the border-line of different epithelial fields and cicatricial tissue, are potent etiological factors in carcinoma.

Law 2. Moderately severe traumata once applied never produce carcinoma.

Law 3. Moderately severe traumata—not to a degree of laceration or fracture—are frequently the cause of sarcoma and the precipitation of tuberculosis.

Law 4. Severe traumata to the degree of laceration or fracture never cause carcinoma, sarcoma, or focalized tuberculosis.

Law 5. Sudden changes in conformation and vascularity, embryonal defects, pigmented moles, warts, papillomas or cutaneous fibromas usually indicate beginning malignancy and always demand immediate removal.

Dr. Blair (closing): In the history of carcinoma of the mouth, I wish to say that syphilis was introduced into Italy in the 15th century, at which time it was observed that the number of cases of carcinoma of the mouth increased materially in number. It is also known that in 50 per cent of all cases of carcinoma of the mouth the disease is preceded by leucoplakia. Dr. Gilmer has pointed out that leucoplakia is secondary to the late manifestations of syphilis. That is very important. Outside of that, there is danger in thinking too much of the relationship between syphilis and carcinoma. We must keep in mind that the two diseases can be grafted together.

Dr. Logan's summary in regard to leucoplakia and other lesions of the mouth is immensely important. For a long time we did not know what to do with the white leucoplakia, but now we can quickly substitute thin skin grafts for the leucoplakia and get rid of the whole thing.

INHARMONIOUS CUSP RELATION AS A FACTOR IN PERIODONTOCLASIA

By A. W. WARD, D.D.S., San Francisco, California

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

SINCE the time of Esculapius, students of the healing art have treated and have sought for the cause of pyorrhea. During the present generation of dentists many theories of the causation of periodontoclasia have been advanced. The uric acid diathesis twenty years ago was the most accepted theory. Next came the idea of senile degeneration of the alveolus. This was followed by the germ theory—the idea that an undiscovered specia but specific organism invaded the gingival crevice and due to its fecundity in this region, brought about a dissolution of the alveolus, accompanied by the infection of the bone, gum, periodontal membrane and cementum, this process being accompanied by suppuration. Later, the (ameba) theory was advanced by some of our most learned researchers. During all the time that these various theories have been propounded by their originators and their disciples, certain other students have clung to the syphilis theory, and many members of the dental and medical profession today are firmly convinced that back of every pyorrhea there is a spirocheta pallida, either inherited or acquired. Still another idea advanced as the causative factor in pyorrhea, is the filth theory. Many practitioners of dentistry believe that most, if not all, periodontoclasias are due to uncleanliness of the oral cavity.

Today an old idea has supplanted most of the foregone theories, and trauma is rightfully given first place as a causative factor in the production of alveolar degenerations. The supporters of the various theories advanced treatments to correct the conditions thought to be responsible for periodontoclasia. Those who supported the uric acid theory sought to prevent and cure by means of supposed corrections of diet, all red meats were tabooed; all meats, soups, pastries and alcoholic drinks were likewise forbidden. Vegetables, especially raw cabbage and celery, were advised as a steady diet.

It is difficult to understand how a patient, with loose, sore teeth, could be expected to masticate tough fibrous food, especially when the teeth were occluding badly, as they usually are in these conditions. The correction of the diet was supposed to prevent the accumulation of the serumal calculus on the cementum, where it was thought to have been precipitated out of the blood stream. Alkali, as bicarbonate of soda and lithia salts, were administered internally to neutralize the acidity of the blood. An attempt was made to remove the deposits already on the root surface under the gingivae by means of solvents and instruments. These were the days of ammonium flouride, aromatic sulphuric acid, lactic and trichloracetic acids.

Those dentists who believed that the alveolus was a transitory structure and its natural degeneration accompanied by pus pockets around the teeth was the natural result of the efforts of nature to rid the economy of members no longer useful as masticators, conceded therefore that the patient had arrived at the age when he should live again on pap as in

babyhood. The idea of the prevention or cure of this degeneration would be laughed at by the supporters of this theory. Patients were advised to allow the teeth to drop out one at a time. Sometimes in order to preserve the teeth a while longer, numbers of them were fastened together with threads, with wires, with splints. No thought was given the teeth as causes of foci productive of systemic disease.

Next, the germ theory,—such a plausible one, such a scientific basis for argument. Many diseases had been proven

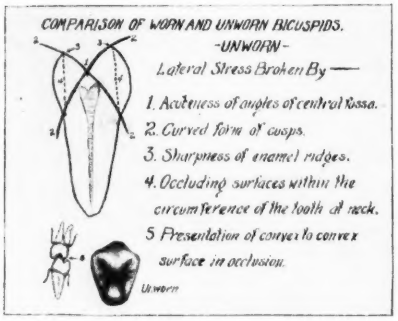
COMPARISON OF WORN AND UNWORN BICUSPIDS.
-UNWORN-
Lateral Stress Broken By —
1. Acuteness of angles of central fossa.
2. Curved form of cusps.
3. Sharpness of enamel ridges.
4. Occluding surfaces within the circumference of the tooth at neck.
5 Presentation of convex to convex surface in occlusion.
Unworn

Fig. 1.—All surfaces of teeth are curves. The occlusal surfaces of bicuspids and molars are made up by the arcs of circles. This figure demonstrates the arc 2-2 and 2-2. The junction of two arcs of circles make an apparent angle. As soon as these arcs are worn until there is an obtuse angle, trauma begins.

to be of bacterial origin and the specific organism isolated. How reasonable was the theory that pyorrhea, a flow of pus from the alveolus, occurring as it did in such a number of cases with the same manifestations, was caused by the same specific organism in all cases.

Diligent research failed to find the specific germ but the same group of organisms was demonstrable in all cases.

What was more logical than the injection of autogenous vaccines, made from cultures from pyorrhea pockets. Such men as Goadby (1) reported cures by injections of these autogenous vaccines. Autogenous vaccines being difficult to manufacture, the accommodating drug houses prepared stock vaccines to be used for the same purposes, and in the day of vaccine popularity, thousands of doses of these supposedly scientific poisons were injected into the bodies of unsuspecting victims afflicted with periodontoclasia, and to no avail.

Strong antiseptic mouth washes were advocated, and powerful germicides were pumped into the pockets to destroy the microorganisms.

Not longer ago than 1914, the pro-

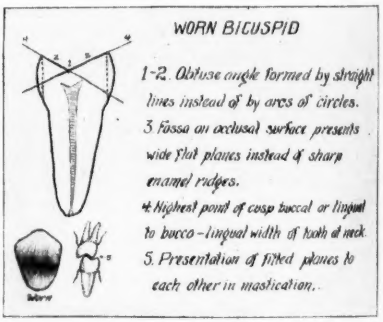
WORN BICUSPID
1-2. Obtuse angle formed by straight lines instead of by arcs of circles.
3 Fossa on occlusal surface presents wide flat planes instead of sharp enamel ridges.
4 Highest point of cusp buccal or lingual to bucco-lingual width of tooth at neck.
5. Presentation of fitted planes to each other in mastication.
Worn

Fig. 2.—Presents the difference in worn teeth. Note the obtuse angles formed by straight lines instead of arcs and circles.

fessions of dentistry and medicine were assured by Bass and Johns (2), Barrett and Smith (3), that at last a specific organism responsible for pyorrhea had been found and also that the remedy for the disease had been discovered. Thereupon ipecac and emetin hydrochlorid became immensely popular. The professions were assured that pyorrhea was caused by an ameba, which was named buccalis. This was about the silliest theory ever propounded, and the damage done to the profession inestimable.

The fact that the supposed cure was advocated by men of such high standing in the medical profession, discredited the endeavors of those operators who had

been for years curing periodontoclasia, and who had been teaching modern methods to others of their profession. Immediately, at the suggestion of Doctors Bass and Johns, the medical profession took their little "hypos" in hand and became specialists in the treatment of the baffling condition, and many of these physicians assured me that they were curing cases every day with emetin hydrochlorid and ipecac internally. Many dentists and physicians used to treat themselves, and would assure their patients and professional friends that the results were marvelous.

The emetin treatment joined the other

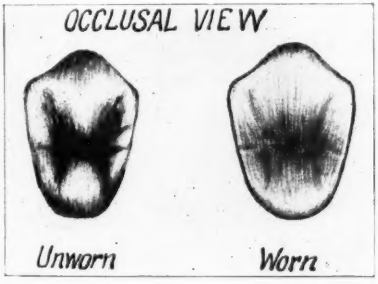

Fig. 3.—Occlusal view, worn and unworn tooth.

drug cures, and today little is written about it except on the wrappers of some dentifrice, which the manufacturers assure the public is beneficial in the cure and prevention of pyorrhea.

As before stated, syphilis has been for years considered a predisposing cause of periodontoclasia. Consequently those who hold to their belief consider arsenic, the iodides and mercury the remedy for the disease. Succinimid of mercury was advocated by Wright (4) of the United States Army Medical Corps. Deep injections into the gluteal muscles were advised as a cure, and the doctor assured the profession he had had marvelous cures with this drug. This treatment did not secure a strong hold upon the profession, probably because the location in which the injection was advised was out of the dentists' field. If it had been recommended to be administered per-

Fig. 4.—Shows what takes place after the reduction of a pyorrhea pocket surgically. This tooth and two other lower incisors were removed three weeks after surgical pyorrhea treatment. Note the elongation of fibers of the periodontal membrane, reaching out for an attachment—to what?

orum, the druggists would probably have been deluged with orders anyway.

Several years have elapsed since suc-

Fig. 4a.—Shows method of removing infection posterior to the third molar.

cinimid of mercury was advocated, and to date, it has not become popular. In fact its ghost has joined the myriads of other ghosts of departed pyorrhea remedies.

Salversan, injected and locally applied,

is being used at the present time in the treatment of pyorrhea, and when Vincent's angina is mistaken for pyorrhea, splendid results are obtained. Because of

Fig. 5.—The first procedure. Using an approximal curette, force it through the gum tissue to the depth of the pocket.

the fact that periodontoclasias are common in many unclean mouths, those who cling to the filth theory are inclined to believe that all periodontoclasias are the result of uncleanliness.

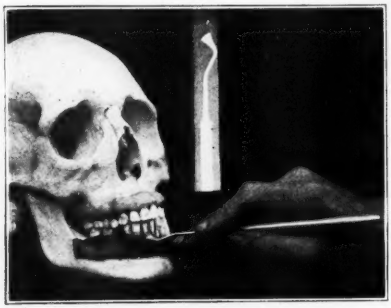

Fig. 6.—The second step. Cut away the flap to the depth of the pocket labially by means of instrument shown. The border of the edge of the infected alveolus on the labial surface is exposed.

No more unfair or unkind theory has been advanced than this. The supporters of this belief have recommended certain forms of toothbrushes to be used in a manner which would appear to be most ridiculously forceful. It has been recommended that the bristles of the toothbrush be forced against the gums with a rubbing motion—not a rotary one—until it is possibe to feel the points of the bristles pass through the approximal surfaces with the tongue. That is, the force used is so great that the bristles touching the gum and the teeth are bent to such an extent that the straight bristles

Fig. 7.—Demonstrates the method of reaching the lingual pockets. The maxilla was used because of difficulty in photographing the lingual surfaces in the mandible. The angle of the instrument may be forced into the crevice formed by the approximal curette and the overlapping gum and alveolus removed at the same time.

force themselves through the interproximal spaces.

I have found that members of our profession have claimed to have cured cases of pyorrhea simply by this radical brushing. Beginning with Riggs, the better thinkers and more skillful operators have depended on local instrumentation alone to prevent and cure those periodontoclasias not caused by specific infection, the one demonstrable being trench-mouth or Vincent's angina.

Those who believed pyorrhea curable by instrumentation were divided into two classes. The first class, Younger and his followers, believed that the removal of serumal calculus was the all important achievement in periodontia. Curious little instruments were designed to "follow the most tortuous pocket," as if there were such a thing as a "tortuous pocket." Students were cautioned to use great care in the exploration of the pockets.

Too much cannot be said for the work of Younger—he marks a period; his work demonstrated possibilities attainable by carefully freshening the root surfaces under the gum. To the operators of his day, the results obtained by Younger were little short of miraculous.

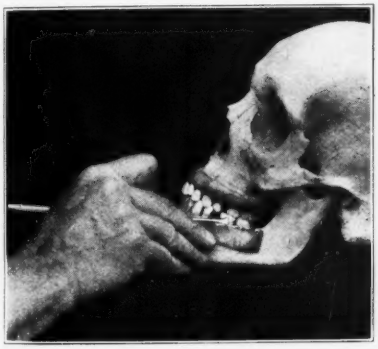

Fig. 8.—Taking up the method of removal of the concretions of calculus on the root surfaces and the curetting of the alveolar border.

Think of it. He stopped the flow of pus from the pockets by instrumentation alone *sometimes*. When the pockets were accessible, a result was obtained, if the operator and patient were lucky; but when the pockets were inaccessible, results were not obtained. The skill of the operator was the all important item in the cure, and for that reason some peculiar developments took place in the profession.

Here and there throughout the country, men who were more successful in the treatment of pyorrhea than their confreres (at least they thought they were) became "specialists." They picked and they tied, and sometimes they medicated. They depended upon instrumentation, but they nearly all "fell" for some nostrum or another, too numerous to mention. Considering that they worked in the dark, that is without radiograms, their achievements sometimes were wonderful; but they worked without system and for the most part without anesthetics.

Fig. 9.—This demonstrates the removal of calculus from the lower posterior teeth and the curettage of the affected osseous tissue.

The ideas that caused the development of the Younger instruments were the same ones that were responsible for the famous set of one hundred and fifty designed by Carr, and described by Patterson in Johnson's "Operative Dentistry." This set of instruments was so designed that positions, otherwise impossible of access to scraping instruments, were readily reached and surfaces of the root planed with remarkable precision. Due to the systemization of these instruments, instruction in their use was possible and usually readily grasped by the dentist under instruction. And for the reason of their shape systemization, splendid

manufacture and also for the aforesaid reason, teachability, the invention of these instruments was a great advance over all other scraping instruments.

Nevertheless the object was the same—to remove deposits on the root surfaces and to surgically freshen the cementum exposed by alveolar degeneration. In fact such care was used that the corner of the blades were rounded and its lower portion was dulled to prevent injury to tissues surrounding the pocket, gum and alveolus.

The benefits derived by the American people during the last ten years, through the use of this type of instrument by

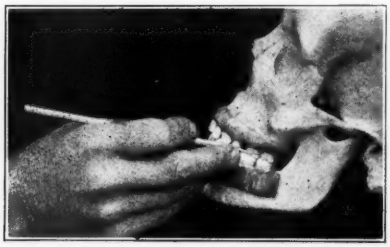

Fig. 10.—Showing method of reaching the approximal surface of upper molars.

careful operators is immeasurable. Yet their use was advocated without anesthesia. Also little or no attention was given to the carious bone and to the infected gum. Consequently, though results were better than those heretofore attained, still without anesthesia, the pathological contents of pockets were sometimes impossible of removal even though the roots were properly cleaned. Also for the same reason (no anesthesia) sharp edges of osseous tissue sometimes prevented the gum from tightening down around the necks of the teeth, defeating the aim sought for,—closure of the pocket by constriction of the gum fibers.

Certain investigators have long held the conviction that in suppurative periodontoclasia the gum and osseous tissues in proximity with the pocket were invaded with bacteria, and the investigations of Box (5) have proven that bacteria actually invade the substance of the gum. One of the oldest methods of treating pyorrhea has been by the obliteration method. That is to say, the gum overlapping the pocket is dissected down to the alveolus, and the exposed surfaces of osseous tissue curetted or burred away with drills until healthy tissue is reached.

This, the most radical of treatments, promises most. The principal objections were the exposure of cementum, inviting caries, unesthetic appearance and sensi-

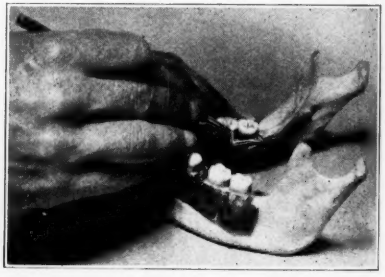

Fig. 11.—A method of removing the flap of gum overlapping pockets on the posterior teeth, especially the lower molars. The instrument shown is so shaped that a steady rest on the anterior teeth is possible, thus permitting exposure of the affected alveolus without danger of slipping.

tiveness. The operation being, as it is, heroic, awes many practitioners, who would not fear to use some little scrapers or scratchers and go into a pocket and stir up the infection.

Through all the years that the obliteration of pocket method has been used, the disadvantages of the operation have overcome the advantages. The traumatized osseous tissue became very painful in many cases, and remained so until it became covered with new gum tissue. This was true also of the roots of the teeth, due to the fact that brushing was impossible and for that matter mastication on the operated side was also im-

possible. The roots became covered with a caseous deposit, portions of which deposit were soon covered with the new growth of gum tissue. The deposit hardening, became an irritant to the new gum, no matter how well the operation was done.

Then too, it has been impossible to properly curette the exposed bone, especially approximately without the use of burs revolved in an engine handpiece. The burs sometimes cut into the root surface and definite technic was impossible in the molar regions especially, and besides it is not considered good surgery to use a bur in bone, especially cancellous bone that has a tendency to plug up the bur, thereby causing burning of the osseous cells by friction.

The flap operation is successful in certain cases, but has the disadvantages of leaving pathological gum tissue which may or may not become normal in time. At any rate, a supposedly surgical clean wound is covered by a curtain of old tissue more or less diseased.

The vacuum process of pyorrhea treatment, suggested by a physician, I merely mention as one of the absurdities that have been tried out and found wanting.

Since dentistry has been a science, and even before, patients have been drugged. Infected teeth have been treated with several score of remedies. They have been tied in, extracted and replanted, ground, scraped and devitalized, almost every conceivable method of treatment has been tried with very little success, in the majority of cases. I mean by the average dental practitioner.

Every year, sometimes twice a year, a new nostrum is advertised, tried out and discarded, only to be followed by a new one. There is a new one before the profession today, and like many of the others, it will be tried out and will fail. The reason of this is a lack of ability on the part of the profession at large to diagnose, and a misunderstanding of the underlying principles.

The foremost underlying cause of pyorrhea is, first not traumatic occlusion but inharmonious occlusion brought about by inharmonious shapes of the arches, inharmonious toothforms and wear of the occlusal surfaces of the teeth. Lack of stimulation of the gums by proper brushing (the methods of Morton (6) of Milwaukee and Charters (7) of Des Moines will supply the needed circula-

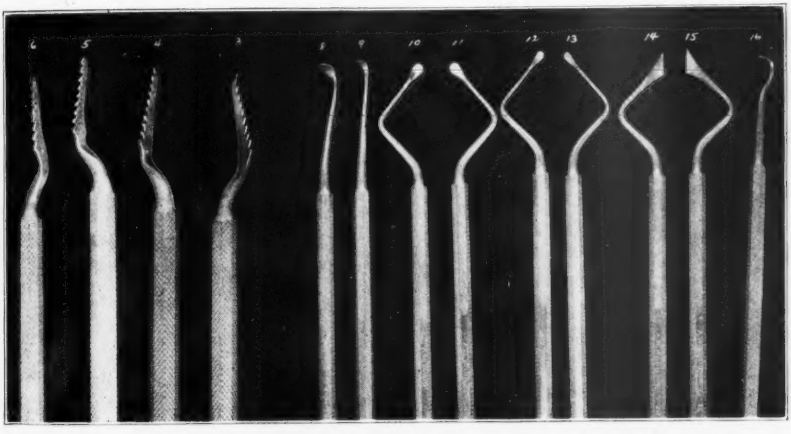

Fig. 12.—Full set of instruments used in performing operations described in this paper.

tion). The alveolus, periodontal membrane and gum are so closely related that stimulation to the gum acts as a remedial agent to the adjacent structure.

In all pockets the obliteration method is advised. The approximal bone is curetted until healthy alveolus is encountered. The instruments for this purpose are push and pull curettes, having saw teeth. These instruments I have recently devised. The blades are forced through the gum to the bottom of the pocket labio or bucco-lingually. All approximal surfaces are operated first, even if ten or twelve teeth are operated at one sitting. The surface of the roots approximally also are curetted at this time. Should the hemorrhage interfere, small pieces of gauze are packed between the teeth. The gum on the buccal surface is removed from one tooth at a time by means of the "battle-axe knife."

The exposed bone on the buccal surface is freshened with a "bone hoe" and the root surfaces carefully freshened with the same instrument. This procedure is carried out over all buccal and labial surfaces.

The lingual surfaces are next attacked with a concave edged bone hoe. The corners of the instrument are forced through the soft tissues mesially and distally in the crevice formed by the approximal curettes. When alveolus and cementum are exposed these surfaces are freshened as in preceding steps.

Just as great care is exercised in the instrumentation of the root surfaces as if the gums were left intact. Polishing of the root surfaces can be done very rapidly, due to the fact that the parts are anesthetized and that there are no overhanging soft tissues.

Fine eighteen inch strips and tapes, charged with No. 4 Svelto are used to polish the surfaces. The most important part of this operation is the after treatment. In order to avoid infection, pain, sensitiveness of the roots, as well as to prevent caseous deposits upon the root surfaces and to provide a temporary support, I have devised a quick setting pack. This pack is mixed like cement and flowed between the teeth and over all exposed surfaces. The tissues regenerate under the pack, which is allowed to remain four to six days after the operation.

All osseous tissues must be covered by new gum before the packing is discontinued. Brushing is advised as soon as tissues are hard enough to tolerate it. Common salt gives the best results in hardening the new tissue. Those teeth which are curable, become tight just as soon as the gum tissues assume their tenseness, provided the occlusion has been made harmonious and the destruction of the alveolus is not too great.

Previous to all operative procedures the occlusion of the patient's teeth has been studied and made as nearly harmonious as possible. The studies are made from casts mounted on a Wadsworth Articulator. The corrections are made in the mouth by carefully stoning very inharmonious and unesthetic cusps and surfaces. The final harmonizing procedure is done by the patient who wears the teeth to harmony by means of No. 1 Svelto placed between the occluding planes.

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Discussion

George R. Lindsay, Denver, Colorado: While I agree with Dr. Ward in his vivid picture of the history of periodontoclasia of early civilization down to the present day, nevertheless there are statements contained in his paper which do not agree with any one experience of my own, and I shall endeavor to talk of them as they appear.

Etiology. The difference between inharmonious cusp and traumatic occlusion relation is hard to define. In fact, one can hardly conceive of the former being present without causing the latter. However, call it what you may, traumatic occlusion or what not, I am of the opinion that it plays very little or no part in the etiology of the disease, although it may be classed as a secondary or aggravating factor, and I shall try to give reason for this belief. Periodontoclasia is a disease of the investing tissue of the teeth beginning at the gingival border and progressing slowly toward the apex of the root, having its inception in nearly all cases before the age of puberty, and in the first and second stage, always curable by simply planing and polishing the accessible part of the tooth surface, and will never return if this condition is maintained. This fact leads one to believe that the etiological factor is something on the surface of the tooth which is removed during the operation. This is the theory advocated by Riggs, Smith, Robert Good, Gillet and Patterson, of the old school, and of a large majority of the modern periodontists. As all of these operators achieve their results by operating on the tooth surfaces exclusively, as no other mode of treatment leaving out this modern step has ever been effective, not even excepting emetin, it would seem to prove this theory conclusively.

I have examined many cases of periodontoclasia, both in clinics and private practice, and am firmly convinced that no one irritant is responsible for this scourge of the mouth, but that by far the greatest offender is abnormally rough enamel surfaces and faulty cementoenamel junctions. These irritate the gum tissues, producing hyperemia and altering blood supply and nutrition, thus lowering tissue tone and inviting infection, and incidentally, they furnish a splendid habitat for pathogenic bacteria.

John H. MacKay, Oakland, California: We have been overlooking the simplest cause of this disease, namely, "Inharmonious Cusp Relations." It is the most destructive of all the various forms of irritations to the alveolar process as the teeth themselves become the medium of irritation. This condition is present in a greater or less degree in most of the cases presented in our offices, and we should look for and correct same. This is real preventive dentistry. Once in a while we have a patient who has been subjecting some of his teeth to undue stress, but instead of the teeth loosening they have simply worn down. The reason for this is, that this particular patient has a very dense process, as we all should have, but for the fact that most of us have for generations been drifting away from the natural mineral bearing foods and partake of a diet from which most of the mineral has been removed in refining.

I want to emphasize the absolute necessity of balancing up the occlusion by means of stoning off offending cusps, after which thorough instrumentation and judicious polishing of the tooth surfaces should take place.

Where the pockets are fairly deep they should be eliminated and the essayist's method is a most efficient one, as he is able to remove with ease all of the granulomatus material usually found in such areas. The manner by which he protects the exposed roots and process which naturally would be sensitive is very effective.

After the case has been treated for periodontoclasia, it is imperative that faulty contacts be corrected and other restorative work done as indicated and as soon as possible.

Joseph A. Pollia, San Francisco, California: In the consideration of this subject of periodontoclasia, it seems to me we are constantly losing sight of a very important pathological fact, and that is that there are no dead spaces in nature, that wherever we see a dead space in the radiograph that dead space in bone tissue is occupied by a degenerating cicatricial tissue.

We have at the alveolar crest of a tooth a thickening of the cervical periodontal membrane, the first radiographic sign. Later on as the periodontal membrane increases in thickness it pushes against the alveolar bone, all the time this space being occupied by a granulating periodontal membrane; in other words a defensive process, and it pushes this bone away until the top of crest deepens downward toward the apex as it is destroyed at the crest. In the radiograph this appears as an empty space. Actually and pathologically it is

filled up with an infected, degenerating cicatricial tissue which must be removed.

In the Golden Gate Park of San Francisco is the skull of a mummy having an edge to edge occlusion of the anterior teeth, all the molars having been lost. According to the sutures of this skull the mummy is between fifty and sixty years of age. There is hardly any alveolar absorption around the edge to edge bite of the anterior teeth. Do you know why? Because since 2000 B.C. the human race has lost all local tissue resistance in order to accommodate an abnormal environment. Now traumatic occlusion would have been taken care of had we possessed this particularly defensive power, but since it has been lost the condition must be corrected. Radiographically traumatic occlusion shows, but it does not show at eighteen years of age.

In periodontoclasia the doctor says all you can do is to remove the cause and nature will take care of it. That is all we can do, and if we can do that we can effect a cure. But we cannot remove all these things. Permit me to let you into something confidential; when you hear a man say he "cures" he really does not know what he is talking about. All we physicians, surgeons, and dentists can do is to control, and nature completes the cure.

T. Sidney Smith, San Francisco, California: Dr. Ward has given a good description of his method of treating periodontal lesions, but I cannot let it go unchallenged as the latest and best method. By advising us to cut off the separated soft tissues, he has admitted that he has failed in his former attempts to get these tissues to reunite to the roots.

After careful scientific investigation, I became convinced that it is biologically possible for these tissues to become vitally reattached and I verified the correctness of this theory as early as 1903. This enables us to eradicate the septic lesions without causing any loss of the gum margins during the treatment.

Dr. Ward's method of denuding the roots leaves an extremely unfavorable condition. He admits the difficulty there is in cleaning these denuded roots, but he either overlooks or ignores the fact that the mutilated gums cannot perform their function. Normal gums not only support the teeth, but their thin margins form a series of almost perfect inclined planes. These conduct the food safely over the deeper structures and are benefited by the friction they receive from it. The surgical removal of the gums transforms these inclined planes into barriers which are constantly bruised by the food.

The removal of the separated gums is an old and very primitive method of treatment which has been practiced so long that it is difficult to find out who first employed it. There is, however, but little doubt that Arthur D. Black is responsible for its present popularity. Other writers, who, like Dr. Ward, claim some originality, have, I believe, merely introduced their instruments.

Dr. Ward lays great stress on the use of local anesthesia and I agree with him that his method of treatment would certainly require it. But if we wish the soft tissues to become reattached to the roots, which is the only sane and strictly scientific result to aim at, we should not use an anesthetic. If the tissues lacked normal sensation we might remove considerable cementum from the roots without the patient knowing it and giving us warning. That would prevent a reunion, as the soft tissues do not reunite to dentin. It is important, too, that the soft tissues should be lacerated as little as possible, that there may be but little repair required. The surgery should be so accurate and gentle that no anesthesia would be necessary.

Frank C. Pague, San Francisco, California: Whether the Carr or Younger instruments are used the results of our work depend altogether upon the technic of the operator. If in his fingers he has not the touch that will locate deposits, he cannot remove them.

In the use of the Carr instruments we are obtaining general results more satisfactorily than in the exclusive use of the Younger scaler, and I say that as a periodontist after many years of experience with the Younger instruments. I have in my operating cabinet a full set of the Younger instruments, together with the Carr set, but I am not able to obtain the technical touch with the aluminum handle, that I am able to obtain with the solid handle of the original Younger instrument.

Dr. Lindsay spoke of instruments with a rounding edge. This instrument was not intended as a curette. The corner of the sharpened blade is rounded to prevent scratching or roughening the surfaces of the roots.

I do not wish you to gain the impression that periodontic conditions cannot be cured, for unless the process is all destroyed they can be. The reason that a pocket appears on the side of a root and does not appear around the root surface of an approximating tooth, is because that tooth is not receiving the jarring bite of the occluding tooth. Remove all the pathology in this area whether you dissect away the gum margin or not.

We do not expect the same regeneration in the patient of sixty that may be obtained at thirty or forty years of age. But if you will remove all pathology that exists around or between the roots of teeth and make sure all the deposits are cleared away, if in other words you have it in your finger tips to follow your

instrument, removing local irritation, you will obtain absolutely healthful results.

The periodontist of yesterday has had a too great consideration for the loose unattached tissue that very often is present both before and after instrumentation. For many years I have removed that tissue, cutting away that loose gum to healthful attachment, then curetting from between and about the roots all existing pathology, cleaning by thorough instrumentation the root surfaces, cutting away the loose, flabby gum, and packing over these surfaces a preparation.

Dr. Ward, (Closing): It is impossible to do thorough dental surgery around infected teeth without an anesthetic, and all deep pockets must be thoroughly curetted. You think the operation very radical, but if you would do one, and withhold your judgment until you have seen the result, I think you would all agree with me.

In regard to what has been said about my method being the same as the method advocated by Arthur D. Black—the aims are the same, the removal of all infected tissues surrounding the tooth.

However, the main point in which my operation differs from others, is in the protection of the wound by cementation. I use a cement which is flowed over the blood covered surfaces, preventing even the saliva from coming into contact with the wound until granulations cover the bone which has been exposed during the operation. This cement is left in position from two to four days and is not renewed until the bone is entirely covered with soft tissue under the packing.

I know that Dr. Lindsay is treating cases which have not pyorrheal lesions at all. His idea is noble—the prevention of the loss of teeth, but the painful part of it is that by the time he knows whether he is right or wrong he will be too old to discuss the matter. He has a theory today which he cannot prove. He contends these lesions are all brought about by the roughness about the necks of the teeth and I contend they are not. Nevertheless I agree that all teeth should be polished as a preventive measure, but that is only one of many preventive measures. I practice thorough polishing of the teeth and tooth roots after operating.

Regarding Dr. Lindsay's criticism of the inharmonious relationship not being responsible for the loosening of teeth. A patient came to me with most of her teeth very loose. She has recently had her teeth thoroughly polished and the work was beautifully done. The occlusion was so good the teeth were not touched with a stone but they were sore and loose. I placed in her mouth an abrasive and had her go through the usual mandibular movements, moving the teeth in all directions, attempting to find inharmonies. This was done for two hours. At the end of three weeks I saw the patient again. She was free from pain and the teeth were tight.

I want you to understand that is given as a cure, as there were no deep pockets. There was a thickening of the membrane of the teeth that were traumatized. If any of you have set a gold inlay that is too high, the tooth carrying it will become sore and loose if the occlusion is not corrected. Eventually it will become affected with a periodontic lesion.

As to the packing of these pockets, the packer works wonders. It is composed of olive oil and oil of cloves, equal parts, Septol, 24 drops to the ounce. The powder is composed of zinc oxid and white resin. If you put this surgical packing in contact with the bone the bone will not regenerate. There must be a covering of blood over the bone. This packing is put over the blood covered bone and around the teeth and becomes solid like cement. It remains in place from twenty-four to fifty-six hours, but the patient is so comfortable after the operation that very often he will mistake the side of the mouth on which you have operated and in masticating break off portions of the cement, necessitating recementing.

If you have a case in which there is but one pocket you certainly would not go all the way round and cut down the gum to that level; but if you had a lateral and cuspid in the maxilla for instance, with a very deep pocket, you would go to the depth of the pocket, freshen all surfaces surgically clean and pack directly into that area from which you have removed the diseased tissues. They will regenerate further than you have ever dreamed, due to the fact that you have changed a degenerative process to a regenerative one.

Dr. Pollia brought out something with which I must disagree. He spoke of the vital resistance of the tissues being lowered so much during the past two thousand years. It may be true, but it is not a proven fact. As to the harmonious occlusion of the six upper anterior teeth, with no posteriors, where the teeth were cupped out and worn down to the gum—we do not see it very often but when the mandibular movements are harmonious this is not uncommon.

In answer to Doctor Smith I will say that perhaps my deductions are somewhat immature as I have only practiced dentistry for twenty years, having graduated in 1902. I have also conducted post graduate classes in periodontoclasia for the last eight years and have probably had the opportunity of drawing as accurate conclusions as any one.

WHY DO ARTIFICIAL DENTURES OCCASIONALLY DISAPPOINT US IN FITTING?

By GEORGE B. SNOW, D.D.S.,[1] Long Beach, California

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

MANY of the reasons which can be advanced for failures in fit of artificial dentures are so well known that they need receive no notice before the profession today.

What I have to say will be confined to a very troublesome condition which gave me great annoyance in my day, and which may be very briefly described. It has been my experience that the most satisfactory fits of upper dentures have been secured when the alveolar ridge was prominent enough, and the teeth were short enough so that the thickness of the plate when the teeth were mounted upon it would be nearly equal throughout; there being no more vulcanite required upon the alveolar ridge than through the palatal portion of the plate; but on the other hand, when there has been more absorption of the alveolar process, and considerable building up was required upon the ridge, so that the thickness of the vulcanite thereupon was considerably greater than that of the palatal portion of the plate, the results obtained were not so good. A study of the vulcanizing process will afford a clue to the reason for the greater success in the first instance mentioned as compared with the second.

But little has been known of this matter until lately, and its application to practice has been grossly neglected. Suffice it to say that the following facts have been fully demonstrated by experiments.

When rubber compound is heated and converted into vulcanite, it increases in density; the fact being evinced by a notable increase in specific gravity; and this phenomenon is accompanied by a proportionate diminution in volume. This change is given the name of shrinkage to distinguish it from the contraction which vulcanite undergoes in cooling, in the same manner as do all other substances. Shrinkage occurs while the vulcanizing process is going on, and is permanent. It is slow at first, and then becomes more rapid; being nearly complete when the time for vulcanizing has half expired; afterwards gradually becoming slower. When the vulcanite is afterwards allowed to cool, contraction ensues; its amount depending upon the amount of change in temperature. If the vulcanite is again warmed it expands in volume. If it again cools it contracts in volume, and these changes may be produced indefinitely; but it may be further said that the expansion and contraction of vulcanite are greater in amount than the expansion and contraction of any other solid among those in common use.

Both shrinkage and contraction are greater in samples of vulcanite containing the least admixture of foreign substances, such as are known as "fillers" and coloring matter, "fillers" being often added to reduce shrinkage and

[1]Deceased.

contraction. These additions affect the strength of the vulcanite, the black vulcanite being the strongest; red vulcanite not so strong; and pink vulcanite, in which the amount of pigment is greater than that of the rubber and sulphur, is notoriously very weak.

The change in volume due to shrinkage is a trifle more than that due to contraction, the volume of the rubber being assumed to be that which exactly fills the mold when the vulcanizing temperature has been first attained.

Vulcanite, as we usually see it, has about the consistence of horn, and has a certain degree of elasticity. When it is warmed to temperatures above 130 degrees Fahrenheit it becomes softer and more flexible. At about this heat a piece of vulcanite can be bent, and if held until cold will retain the shape which has been given to it. At still higher temperatures it is soft and cartilaginous. Therefore, at the time the vulcanizing process is completed the shrinkage of the vulcanite has taken place, and is manifested by the withdrawal of the vulcanite from the surface to which it has the weakest attachment. In the case of a vulcanite denture it will have a stronger attachment to the plaster surfaces of the mold, which are more or less porous, and will withdraw most easily from the dense surfaces of the porcelain teeth, and from the tooth-pins. This results in formation of pockets between the teeth and vulcanite, which are usually unseen, but which in time, after the plate has been subjected to service in the mouth, become filled with saliva and fine particles of food. The tooth-pins are often insecurely held in the vulcanite, and the upper incisors sometimes become displaced for this reason, starting loose from the plate. Red vulcanite, which has less shrinkage and contraction, and a fair amount of strength, is therefore usually preferred to the purer varieties in constructing artificial dentures, but the red color is obtained by the use of a considerable quantity of vermilion. This is a bisulphuret of mercury. As a rule, mercurial salts are poisonous, and while red vulcanite is usually tolerated in the mouth it causes considerable annoyance in some cases. When its effects are slight the cause is often unsuspected, and the patient submits to a condition which would instantly pass away if black vulcanite were substituted for red in the denture. All red vulcanites contain vermilion. There is a belief that "maroon" vulcanite has other coloring matter. This is erroneous. Inquiry of different manufacturers of dental gums establishes the fact that the coloring matter of maroon rubber is vermilion, probably used in less quantity, and modified by ivory black.

As the shrinkage takes place while the vulcanite is hardening, and while it is very soft, its effects are more marked than those of contraction; for contraction takes place after the rubber compound has been completely converted into vulcanite; and when it "flows" less easily than it did while the vulcanizing process was going on. Compensation for shrinkage is therefore an important matter. This can be accomplished by the addition of a certain percentage of rubber compound beyond what is necessary to fill the mold, and by the use of spring pressure upon the flask after vulcanization is partly complete; the flask being allowed to remain open at first far enough to permit the retention of the small extra quantity of rubber required.

If the ordinary bolted flask is used both shrinkage and contraction will be present in the vulcanized denture to their full extent, but even under these conditions, Dr. Gysi (1) of Zurich, Switzerland, has pointed out a way by which an accurate fit of a denture to the model can be obtained.

When the denture is flasked and made ready for vulcanizing, it is the usual practice to prepare the surface of

the model so that the palatal surface of the plate will be as smooth as possible. This is accomplished, either by coating it with liquid silex or collodion, or covering it with thin tin foil. The lingual surface of the mold receives no such preparation, and as the shrinkage of the rubber causes it to leave the surface to which it has the least adhesion, it leaves the surface of the model; and the fit of the plate to the model will therefore be more or less imperfect. It will be seen that this condition is exactly the reverse of what is necessary for good fits. Dr. Gysi therefore suggests that the surface of the model should be left without preparation; the rubber compound being subjected to pressure while soft, and while the case is being heated to the vulcanizing point, will penetrate the pores of the plaster and become strongly adherent thereto. He suggests covering the lingual surface of the mold with tin foil so that while in its shrinkage the vulcanite will be strongly adherent to the model, it will leave the lingual surface of the mold in preference. If this is done, and the flask is not opened until it is cold, and contraction has been completed, the result should be a very satisfactory fit of the plate to the mouth.

How far will the adhesion of the vulcanite to the model be of benefit? Only so far as the denture is allowed to bear upon the mouth.

The bearing of the upper denture should be limited to the alveolar ridge, and the rear border of the palatal portion, and it is now usual to extend the rear of the denture backwards so that it will bear upon the soft palate in preference to the hard palate. All the area of the hard palate should be out of contact to such an extent that it will not come into contact when the elastic tissue of the alveolar ridge yields to the pressure brought upon the teeth during mastication.

When a considerable amount of building up is required upon the ridge, why not overlay the palatal surface of the model with heavy tin foil, say No. 30 gauge, extending it to within one-eighth or three-sixteenths of an inch inside the summit of the ridge?

While the benefits to be derived from Dr. Gysi's suggestions are fully acknowledged, and their trial is urged upon those present, it is also believed that still better results will be obtained if the shrinkage of the vulcanite is compensated for. As it is, the vacancies between the teeth and vulcanite will exist to their full extent, the insecurity of the hold of the tooth-pins in the vulcanite will be as great as ever, and there will remain the same tendency of the incisors to separate from the denture. This will call for the use of dental gums containing a considerable amount of foreign matter; and this is not always desirable.

Supposing that the ordinary method of packing and vulcanizing is used, and the thickness of the vulcanite on the alveolar ridge is about equal to that of the palatal portion, the shrinkage will be about the same, both on the palatal and alveolar portions, but if the thickness of the vulcanite upon the alveolar ridge is two or three times the thickness of that in the palatal portion, there will be a proportionately great difference in the amount of shrinkage between these two areas, and it is in such instances that the method suggested by Dr. Gysi will be of the most value.

In the matter of lower dentures, it is now usual to "rebase" them by lining them with a thin layer of compound after the dentures have been fitted to the mouth, re-flasking, replacing the compound with new rubber, and re-vulcanizing. When the impression is taken in this manner both plates are in position, and the patient is directed to hold them in firm contact until the compound has hardened. The impression is thus taken when the plate is under pressure as it will be when mastication

is performed, and it is often the case that a considerable amount of "suction" is obtained.

The packing and vulcanizing of a denture is too often deemed to be of minor importance, and is often left to inefficient help, or relegated to a dental laboratory; but in some cases the difference between a satisfactory and unsatisfactory fit will be found to be in the management of the case at this time. The construction of an artificial denture requires care and experience from start to finish.

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Discussion

M. H. Dunham, Omaha, Nebraska: Is it not safe to presume that a large majority of us have seldom taken the trouble to classify these misfits in vulcanite dentures and sought to rectify them as has Dr. Snow? Have we not just laid the blame to some faulty step in our technic and dismissed them from our minds? I fear we have. In fact only two of our number have gone into the subject deeply enough to feel that they have had anything to report. I refer to Dr. Snow (2) and Dr. Gysi (1), formerly of Zurich, Switzerland.

Dr. Snow briefly defines the difference between shrinkage and contraction of the material under discussion. The former, shrinkage, is the lessening in volume peculiar to this compound while the latter, contraction, is a property inherent in all materials to a greater or lesser degree. As described it is so great with vulcanite that unless checked or controlled it is the source of considerable annoyance.

The method of overfilling the mold to counteract the above properties is quite precarious even though accurately machined flasks be used and kept under spring pressure during the entire process. Dr. Snow prefers to attempt to compress the rubber compound during the packing, using only what little heat is contained within the flask by the washing process, closing the same in boiling water. The specific gravity of the rubber compound is thereby increased before the process of vulcanization is begun. May I be permitted, to describe in detail, a method which in my hands suffices in nearly, if not all, practical cases?

In flasking, I prefer to use a heavy machined flask accurately constructed so that when the two parts are put together they can assume but one relationship and will maintain this relationship throughout successive operations of opening and closing.

Since this is to be a vulcanite base, the stone cast is trimmed until the periphery of the base lies in a horizontal plane with the edge of the lower half of the flask. If it is to be a metal base denture, the stone cast will not be used but the case will be invested so that its periphery lies in the horizontal plane as suggested.

I use hard cast plaster as an investing material, and this, after the primary set, but while it is still easily manipulated, is trimmed so that no undercuts will remain. It is given a smooth surface, which is also continuous with and in a plane with the periphery of the pattern and edge of the flask. Loose particles of plaster, which have come into contact with the wax pattern are removed with a brush under cool running water. Diluted liquid silex or thin soapsuds is then supplied in order to facilitate later separation of the two parts of the flask.

The upper portion of the flask is placed in position and filled with plaster, taking care to drive out all air during the process. After the plaster is thoroughly hardened (this may be determined by preserving the excess and testing it) the flask is placed in boiling water for a period of from one to two minutes, depending upon the size of the flask. The two parts of the flask may then be separated easily by holding the flask by the upper portion and tapping lightly with a horn mallet until the lower releases itself. The wax will be found somewhat softened but it should not have remained in hot water long enough to become fluid; this softened wax is removed and the case thoroughly washed out. For this purpose hot water is used, and it is not wise to use the same water in which the flask is boiled, because this is likely to contain sufficient wax to deposit a thin film of grease. Such a film makes it difficult to pack with rubber, without incorporating some of this greasy deposit. When this method of washing out the wax is followed, the exterior of the flask is also more easily kept clean.

The teeth and exterior of the mold are cleansed by the use of chloroform.

Walker's Granular Gum rubber is cut lengthwise in strips of sufficient width to extend from the lowest point of the *interstices* between the teeth to the highest point on the periphery or to the rim of the base. A strip is carried from a line posterior to the second molar to a corresponding point on the opposite side. Inasmuch as this periphery is irregular in height, there will be an excess of gum facing at the low points which will need to be cared for. The strip is folded over upon itself, thus making a double thickness at the low points. With considerable pressure, preferably using a blunt instrument, the facing rubber is packed carefully between the teeth, entirely filling these spaces and making sure that none of this strip of rubber surrounds the pins, or, in case of diatoric posteriors fills the retention pits.

A strip of base rubber long enough to extend from tuberosity to tuberosity is packed into the retention grooves and around the pins, special care being taken that the base rubber shall not displace the granular pink and thus show when the finished denture is worn. At no time is heat used during the process of packing save the heat contained within the flask, thus avoiding the use of prematurely expanded rubber. In a full vulcanite denture a layer of base rubber is now placed over the palatal surface of the mold and by means of pressure connected with the strip of base rubber which has just been packed about the pins. Since there is not a sufficient amount of rubber in the case at this stage a strip of Holland (the linen material between which the sheets of rubber are put on the market) is moistened in hot water, washing sufficiently to eliminate the starch, and placed between the two parts of the flask. The flask is closed, put into a Wilson flask press with volute spring and placed in boiling water, where, as the rubber softens, the flask is *gradually* closed. Throughout this process, care is exercised to avoid sudden pressure at any stage. When the flask has closed, it is then removed from the press, the two parts separated and the surface of the rubber is washed with hot water to remove any traces of starch that may have been left as a result of contact with the Holland.

When separated, the surface of the rubber will show areas upon which no pressure has been exerted. These areas are now supplied with additional base rubber and any slight excess that may overlap the periphery, is removed with a sharp wet knife. In full vulcanite, a thin layer of base rubber is now adapted to cover the surface of the granular rubber from the periphery to its juncture with the base rubber previously placed. We now have the entire palatal surface covered with base rubber; the Holland is replaced, the flask closed as tightly as possible and put again into the flask press and boiled until it is entirely closed as before. At no time should there be an excessive amount of rubber in the mold, since under pressure the gum facing will become so very thin that the red base rubber may through polishing, be exposed, and further, the granular gum under too great pressure may be so distorted as to result in an unnatural appearance of the gum facing, as well as cause a fracture of the mold, displacement of the teeth or cause the vault to warp.

Again the flask is opened and the rubber cleansed as we have previously indicated. If the surface shows that a sufficient amount of rubber has been added during the successive openings and closings of the flask, the flask is now ready to be closed preparatory to vulcanizing. The technic that we have followed seeks to avoid an excess of rubber and consequently I am willing to open the flask three or four times if necessary in order to add a little more rather than to risk adding too much at any time.

The flask is closed, four Little Giant flask springs adjusted and put into the vulcanizer where the case is vulcanized. The heat of the vulcanizer is brought through a period of thirty minutes, up to 320 degrees Fahrenheit and held at this temperature for one hour. At the end of this period the vulcanizer is removed from the flame, gradually cooled until the flask may be removed and allowed to become *thoroughly* cold when it may be opened and the case removed and cleaned with a stiff brush under running water. All surfaces except the *intaglio* are smoothed by the use of fine grit sandpaper. Uneveness is trimmed away from around the necks of the teeth and any scratches are removed with the use of cloth wheels, felt cones and brushes aided by powdered pumice, and a high polish is given with cloth buffer and whiting.

If this method of packing is followed out, care being taken to never overfill the mold, the use of so-called flood gates may be dispensed with.

Supposing we are able by this method to cause a ten per cent compression, then when vulcanization is complete and case has resumed room temperature, the rubber compound will have been under constant pressure during the whole period of hardening.

In cases where the vulcanite base is extremely thick the method as credited to Dr. Gysi is undoubtedly of value. The vulcanite will unquestionably leave the foiled surfaces and cling to the porous ones. It is, however, rare that we are called upon to construct dentures of this character since the advent of

the present molds of porcelain teeth. They are now being manufactured long enough to nearly if not quite extend from the plane of occlusion to the alveolar ridge.

W. A. Giffin, Detroit, Michigan: Dr. Snow has demonstrated by his experiments that when rubber compound is converted into vulcanite we have a substance with greater specific gravity, but with less volume. The change has produced shrinkage.

He has also shown that further changes in contraction and expansion take place after the vulcanite is subjected to severe changes of temperature. These facts have been verified by Doctors Wilson, Gysi, Engstrom, and many other investigators. We must accept those findings and realize that those changes in vulcanite denture construction cannot be prevented.

The question for us to consider is the best technical procedure for us to follow in order to minimize these changes which cannot be prevented, in order that they will be so slight as to render misfits in denture work practically insignificant. The packing and vulcanizing of a denture is just as important in every detail as any other steps in denture technic, but no more important. Therefore, it is essential that both cast and investing matrix walls be of such consistency as to withstand any accidental stress that they may be subjected to.

After many years of experience in this work, I have found that the following technic does, at least in my hands, minimize to a great extent the changes that take place.

The cast is constructed of the desired stone, reinforced with a Kerr approximate metal model. The teeth of the wax model dentures are invested, cusps down in a Greene-Kerr occlusal retainer. This is for the purpose of retaining the positional relationship of one tooth to the other in the same denture. The cases are then flasked in a boltless type of flask. Place the upper half, or that portion of the flask containing the teeth, in a heating oven and allow to remain until it is warm throughout.

In packing the case it is well to bear in mind that it is better to underpack previous to the test, than it is to overpack, because it is easier to add more rubber than it is to remove the surplus.

When case has been packed to about the proper amount, place a piece of moistened cambric that has been washed of all its sizing, over the rubber and place the lower or cast section of the flask in position. Place the flask in the heating oven and allow it to remain for five minutes at a temperature of 220 degrees Fahrenheit and then gently press the halves of the flask together either with hand pressure or very light press pressure. If they are held apart about one-sixteenth of an inch the case is packed sufficiently. If more than that, too much rubber is present. If the halves of the flask touch one another, not enough rubber has been packed in. Separate and remove the cambric and treat the cast section as desired; by this, I mean, coat with desired coating solution of tin-foil or gold-foil the cast.

To vulcanize the cases it is necessary to use an entirely different type of vulcanizer than that now in common usage. The celluloid press is an example of the type of machine that is advocated for vulcanizing rubber. Dr. Snow has devised a machine which embodies the principle of which I speak. This machine is known as the "Snow Compensating Vulcanizer." I, however, have used for many years previous to the introduction of Dr. Snow's machine the instrument known as the "Edson vulcanizer and celluloid press." The principle is the same viz: close the flask in the vulcanizer when the celluloid blank is in its most plastic condition, to prevent distortion of the model and matrix walls. What is good for celluloid is just so much better for vulcanite, even though vulcanite is more plastic in its raw state.

We are now ready to bring both halves of the flask together. The guide pins help in this respect. Do not place in a flask press—the case, having already been tested, it is not necessary. Place the flasks in the stirrups. The screw is turned and the flasks drawn up against the cover, just sufficiently to hold them from slipping. Pour about three ounces of water into the pot and screw on its cover, which contains the stirrups and flasks, then reverse the stirrup screw so as to take all pressure off of the flasks, then apply heat. The air valve is opened to allow the static air to escape. When steam is generated or when the thermometer registers 212 degrees Fahrenheit, close the air valve.

Rubber is in its most plastic condition at 250 degrees Fahrenheit, approximately. When the thermometer registers 250 degrees Fahrenheit, turn off the heat and close the flasks by turning the stirrup screw about one-sixth of a turn at minute intervals, slowly and sufficiently to bring the halves of the flasks completely together. This will take about ten minutes, the heavy guide pins on the flasks carrying the halves of the flasks together in their proper relation to one another. The case having already been tested, very little, if any rubber is squeezed out between the halves of the flasks. After the flasks are closed the gas is relighted and the process of vulcanization performed as usual with this exception, that slow vulcanization is the best and the time required depends upon the thickness of the denture. The best temperature for vul-

canization is 300 degrees Fahrenheit for two hours. In this manner of flask closing, the halves are brought together when the rubber is at its most expanded and at its softest stage, and the closure is made to gradually follow up the initial contraction, thus eliminating compression and distortion of the cast and matrix. The expanding rubber having had no pressure except the weight of the upper half of the flask exerted upon it, naturally cannot cause a compression of the plaster matrix walls or cast. Among other advantages in using this type of vulcanizer, the cases are never vulcanized in water but are held suspended in the live steam by the stirrups.

After the vulcanizing of the case it is advisable to leave it in the vulcanizer for at least six hours, or until the vulcanizer and case have cooled down to room temperature, before removing it. This tempers the rubber.

When dentures are constructed in this manner, very little, if any, trimming or scraping is necessary. The palatal portion of the denture will require very little touching due to the fact that the polishing plate had been constructed for the case and to which the rubber had been vulcanized.

Dr. Snow (closing): I would like to say that Dr. Dunham has given us a very good technic, indeed, for the production of an artificial denture. The principal point for objection to it is that in preparing the flask he uses no gateways. While his work amounts to a demonstration that these are not absolutely necessary I still believe that it is better to remove the surface of the plaster from one section of the flask up to within one-sixteenth of an inch of the mold, by a slanting cut, which gradually deepens as it goes outwards from the mold. This does no harm, and assures the closing of the flask, even if a little rubber should escape from the mold. I do not believe in notching this edge which is left around the mold, for the edge should be so narrow that if the spring pressure used is efficient, the escaping rubber will be bitten off as the flask closes, and it will close perfectly.

These two points, a continuous narrow bearing surface immediately around the mold, and efficient spring pressure, will give good results unless the plate is one of more than usual average thickness, but the treatment in vulcanizing must be modified, according to the circumstances of the case. The method which Dr. Dunham describes will give as good results as are possible in a very large proportion of cases which are vulcanized, but it is not applicable to all. It is more applicable to upper dentures in which the area of the plate is large than it is to lower dentures which have a considerably smaller area and in which a greater average thickness of rubber is necessary. In such cases it is often advisable to prevent the closure of the flask by the interposition of thin props, and to vulcanize for only about half the requisite time; then to remove the flask from the vulcanizer, remove the props, and finish vulcanizing; allowing the flask to be closed by the spring pressure during this second period. This expedient is only necessary in the treatment of those cases which involve a considerable average thickness of rubber. It is conceded that it is somewhat inconvenient but it is effective. The alternative is the use of a vulcanizer having a flask closing mechanism by which spring pressure can be applied to the flask, while it is in the vulcanizer and at any time during the vulcanizing process.

THE VALUE OF ELECTIVE LOCALIZATION PHENOMENA AS EVIDENCE OF A RELATIONSHIP BETWEEN DENTAL INFECTIOUS FOCI AND SYSTEMIC LESIONS, WITH SPECIAL REFERENCE TO APICAL INFECTIONS

By THEO. B. BEUST, M.D., D.D.S.,[1] Louisville, Kentucky

A NUMBER of recent contributions to dental and medical literature purporting to establish a causal relationship between dental and infectious foci and systemic disease attach, apparently, an unjustifiable importance to the phenomena termed "elective localization."

It has long been known that bacteria from a lesion, for instance from a focus in a kidney, might give preference to a colonization in the renal tissues if transferred to a new host. Also that bacteria from cardiac foci, when transferred, appeared to prefer the cardiac tissue, while infections from arthritic diseases displayed tendencies to select the joints for their habitation. The preferences thus observed have been referred to as examples of elective localization. Elective localization phenomena therefore embrace the faculties possessed by a virus of habituating, after transfer to a new host, in tissues corresponding to those from which it was primarily derived.

During recent years the above described observations have been largely utilized to support the contention that septic dental foci stand in etiological relationship to systemic disorders. Their emphasis, it appears, has had a profound influence upon the present conceptions and treatment of systemic disease, whereupon countless functional teeth have been sacrificed. It therefore seems opportune to present some considerations pertaining to this class of evidence.

The mental attitude of the serious dental practitioner should be influenced by a number of reservations before drawing conclusions from the behavior of microorganisms during experimental research. It is fortunate for those who desire to demonstrate a favorite idea but unfortunate for the harmonious evolution of science, that the biological manifestations of microorganisms are extremely inconstant. Results of experiments moreover are susceptible to misconstruction; preconceived results furthermore may frequently be attained by a manipulation of the factors concerned. Manipulation to promote the attaining of an end, is, as is well known, accomplished by subjecting either the microorganisms themselves, or their hosts, to such influences as alterations in temperature, habitat, or nutrition; to exposure, fatigue, intoxication or mutilation. Hereby the agents concerned in the investigation may oftentimes be trained, persuaded, or in some manner induced, to alter their morphology or biological faculties at the will of the operator. At this juncture, however, attention must also be called to the possibility of the occurrence of alterations during a deviation from normality in the host, through which changes accomplished by a manipulation in the laboratory may be duplicated.

With these general remarks before us a study of a few salient features may be undertaken. Nearly forty years ago R. Koch embodied in the formula which

[1]Working under grant from the Research Commission of the American Dental Association. University of Louisville, College of Dentistry.

has descended to us as Koch's Law an idea which, in one of its interpretations, corresponds to our present conception of elective localization. A part of Koch's demands for the demonstration of the specificity of any organism may, to illustrate our purpose, be repeated here. He says: "The microorganisms must be present and demonstrable in every case of a disease; inoculation into animals must reproduce the disease."

With Koch's views in mind a negative aspect of the phenomenon under deliberation will first be remarked upon. It is well known that several carefully studied pathogens, germs which are beyond a doubt etiologically identified with the diseases attributed to their presence, will not conform in detail, to Koch's provisions, nor will they when injected into susceptible laboratory animals, display the power of elective affinity; at least not unless they are especially manipulated. For instance the Bacterium pneumonia will not locate in the lungs. The Bacillus typhosus will not localize in Peyer's patches; the Micrococcus intracellularis meningitidis will not localize in the meninges; the Bacterium mallei will not localize in the nostrils of field mice, for which it is pathogenic although it will do so in the case of the guinea pig. The Bacterium diphtheria will not localize in the throat on simple injection but can be made to do so by performing a tracheotomy and depositing it there.

The behavior of these microorganisms show: (a), that the elective localization tendency is not necessarily characteristic of pathogenic bacteria; (b), that they do not necessarily produce the morbid process with which they were associated, when inoculated into lower animals.

In any experiment in which a culture (in many cases containing millions of individuals) is introduced into the system of an animal, we naturally expect them to locate somewhere, if at all. This "somewhere," as is shown by examination of records, stands in little or no relationship to the location of the focus from which the germs were taken. This is especially conspicuous when experimentation with streptococci is being carried on.

It has heretofore been generally conceded by investigators that, of all the bacteria, the behavior of the streptococcus group has been the least conducive to the framing of conclusions. Their oft noted variability, coupled with their importance, has proven so fascinating that numbers of the ablest men of science have given them especial attention. Their classification, a consideration of which we can dispense with for the present, is still controversial, while their biological manifestations, with which we are directly concerned, is still more so. A few of the opinions current in standard bacteriological literature, alone are sufficient to show, that experiments thus far advanced by our research workers in this field are inadequately adapted to cause such calamitous alterations in our methods of procedure in treating roots. A cursory perusal of the streptococcus literature impresses one, that, specific identity cannot be established through the production of similar symptoms by injecting streptococci into laboratory animals; that the virulence of streptococcus culture as exhibited upon animals under experiment stands in no relation to the intensity of the pathological process from which it was derived; that its manifestations depend largely upon other microorganisms with which it happens to engage; that a strain taken from erysipelas is as apt to produce an endocarditis, as a strain from an endocarditis will produce erysipelas, and furthermore that the streptococcus possesses more multiferous activities than any other organisms.

After this brief characterization of streptococci, an examination into the cause of our present day ideas of the relationship of dental foci to systemic lesions will be undertaken. The years 1915 to 1917 appear to mark the epoch

of the about face of the "root-fillers" and simultaneous with the halt in their triumphal march, we find the potent inception into dental literature and practice of the modern conception of dental foci. The streptococcus viridins at this period assumed its own and today we are laboring under its ban.

THE STREPTOCOCCUS VIRIDINS!

A germ without a history, according to many authors a germ without a proven existence, for it is often looked upon as a transient variety. Until recently considered (if at all) a harmless saprophyte, it today has assumed the role, in dental literature, as the causative agent in the production of a score and ten of the diseases peculiar to human flesh. Declared to be a constant inhabitant of the mouth, tonsillar crypts and intestine, the ubiquitous prevalence of this organism enables it, above all others to gain access into septic hearths about the gingivae and apices and also into the general circulation.

We will now remark upon some features of the research work which first brought this organism into prominence and discuss some manifest incongruities in the evidence generally cited as proof of an existing relation between apical foci and systemic disease.

For the purpose of illustration brief reference will be made to some of the research reports which have influenced our present day practices. Of Rosenow's works the easily accessible publication in the *Cosmos*, (1) appears to have attracted the most attention. In reporting on his investigations in the chapter on "Dental Foci of Infections as the Causes of Nervous Diseases," page 488 we read under the explanations of Table II the following reference to the source of the cultures used in the investigation: "Those given in Table II were from foci of infection only. The focus was usually in the tonsil, but identical results were obtained in numerous instances with the bacteria from alveolar abscess, pyorrhea pockets and sinuses."

It is not our purpose at this moment to dispute Dr. Rosenow's observations on the selective affinities displayed by the organisms then being used. We feel free to confess however, that we do not believe that any deductions from positive findings in lesion production can be made, especially if any specificity is to be demonstrated, by the use of a virus from any other source than a dental abscess infected by only one kind of germ. In this connection would call attention to the utilization of virus from such obscure diseases as mumps and spinal poliomyelitis (See Table II).

The conceded fact that bacteria from the alimentary and respiratory do, both during health and disease, gain access to the circulation, a priori invalidates cultures from such sources as tonsils, pyorrhea pockets or open sinuses. In fact the investigations show, if anything, that no relationship whatsoever can be adduced from the observations, for if tonsillar microorganisms produce the systemic lesions now commonly attributed to apical infections, we find here a proof that apical bacteria, even though they be present, are not necessarily concerned in any observed cases of systemic disease. No one is prepared to dispute the fact that tonsillar organisms do enter the circulation.

On page 489 we find a description of a case which has been given particular mention both here and in other contributions (2). This case was diagnosed as "a pulpitis myositis and dental neuritis." Here we learn that the focus from which the cultures were taken contains "diphtheroid bacilli and gram negative bacilli." This case is disqualified because it has not at all been shown that the streptococcus injected was in any way etiologically active in the lesion. The experiments may, in this case, have been made with a saprophitic commensalite. In examining the description further we find no less than five varieties present

(diphtheroid bacilli; Gram negative bacilli; Gram positive diplococci; Fusiform bacilli and Gram positive bacilli) either of which may have been the causative factor. Upon critical examination it will be seen also, that the animals used in illustrating (2) were examined entirely too soon for valid deductions. They display in our estimation, not a selective affinity of the streptococci for the teeth, but a regional infiltration oedema which incidentally and naturally affected them. To prove an elective localization for our purpose, bacteria from dental abscesses would necessarily be required to produce lesions about the teeth after inoculation into parts remote therefrom.

Granted that streptococcus viridins has in some instances displayed selective affinity, it has not yet been proven to be the organism initially concerned in dental abscess, although our literature is not lacking in expressions of this belief (3), (4), (5), (6), (7). Nor is the streptococcus viridins generally accepted as the specific germ of arthritis. It moreover is well known that arthritis may appear in lower animals after injection of a variety of bacteria, also by using bacteria taken from a wide range of sources. The requisition therefore of the cases of arthritic production following the introduction of streptococcus viridins to prove an influence of apical foci on the system, even if these organisms are invariably found in apices, is poorly chosen.

Gilmer and Moody (8) report finding the streptococcus in forty cases examined. They speak of contaminations with "unimportant" mouth bacteria. Why unimportant? In a paper read before the American Dental Society of Europe (9) attention was called to the many representatives of the microbial flora of the mouth that failed to appear when making cultures from dental foci on ordinary laboratory media—in many cases on any known media. The presence of these organisms is common in dental lesions and they should not be overlooked because of their failure to appear in the cultures. No investigation can be complete and certainly not conclusive without their consideration. This is an entirely unexplored field. Gilmer and Moody disregarded these forms.

In view of what has been set forth it may well be assumed, that as many microorganisms (for illustration, the streptococcus viridins) gain access to the circulation by way of the tonsils, nasopharynx and duodenum, as from a chronic apical abscess. It has been urged that bacteria in an abscess have been rendered virulent by such a habitation. Replying to this, if a mental exacerbation be permitted, it could be contended that the dissemination of a few germs by a chronic alveolar abscess into the circulation may as well produce an immunity to, as cause the systemic lesions commonly attributed to it.

Septic foci should be removed, where they actually exist, but the indiscriminate use of exaggerated and unsubstantiated suppositions concerning septic foci and their influence for the purpose of overthrowing traditional methods of dental practice must be condemned.

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THE RELATIONSHIP BETWEEN THE DOCTOR OF MEDICINE AND THE DOCTOR OF DENTISTRY

By BRIGADIER GENERAL CHARLES E. SAWYER, Washington, D. C.

(Read before the National Capital Dental Society, December 5, 1922)

I FEEL that we have finally arrived at a place in the affairs of our professions and the welfare of mankind generally where we should have a clearer and better understanding relative to the relationship of doctor of medicine and doctor of dentistry.

I would be remiss if I did not take advantage of this opportunity to say to you as a body of dentists that the progress you have made in your profession, the splendid enlargement of your field of usefulness, the thorough knowledge of the entire human machine your standards of education demand, qualify you for much more extensive service and entitle you to much greater credit.

It must be pleasing indeed to you to have noted and participated in the wonderful strides dentistry has made. When I recall the service your profession provided in the building of the great American army and how you conducted yourselves during the World War, what splendid assistance you gave your country, I have great joy in offering to you, as American dentists, congratulations both upon your activity as dental surgeons and the wonderful results accomplished.

The war opened for you a new epoch in your work, which, if taken proper advantage of, will promote your interests individually and as dental associations and schools particularly, more than anything which possibly could have occurred otherwise.

If it did not seem like bragging, I should like to make a similar statement regarding the doctor of medicine, for when I realize the greatly important part the medical doctor is now taking in the affairs of the nation, in its governmental relations, how much more highly he is being appreciated, how much better he is understood, how much better service he is rendering, it is a great source of pleasure to me to be able to help to bring about a co-operative relation between these two splendid branches of humanity's service, whereby the progress of all may be still more rapidly advanced, and more clearly defined.

The dentist of today, as I interpret the signs of the times, is riding at hightide, and as he attains the glories and joys of appreciation, he should not forget that this new relation brings to him also greater responsibilities.

The dentist who really thinks of mankind and the assistance he can render afflicted humanity, is not the man who counts his success by the number of dollars he places in his coffers. The real dentist of this day is the man who conserves and saves, upbuilds and helps to prevent complications and general constitutional disorders which may come through the channels of mouth and teeth, as they affect the entire human body.

I will remind you in this particular connection that as I see the sacrifices that are being made of teeth at the present time, the general wholesale extraction, I am reminded of my early experience as an emergency surgeon. I had the reputation of doing a neat and successful amputation, but never did an arm or leg or a part of the body drop into the basket but that I thought to myself how really incompetent. So I feel now of the wholesale extraction of teeth.

Extraction of teeth is only a mechanical job, as the amputation of a limb or the removal of an appendix, which may be performed by anyone with proper instruments, but the real dentist is the man who saves the tooth, the man who is able to provide ways and means whereby nature's endowment and the individual's inheritance may continue with him, to serve him as it should, in a better way than any possible mechanical contrivance ever invented can possibly do. With this understanding I wish to be recorded as being for the most conservative methods in dealing with teeth by real dentists who recognize the importance and value of them.

Do not understand me as decrying in any way the extraction of teeth that are really irreparable, but do understand me to appreciate from a doctor of medicine's standpoint the fact that the extraction of teeth is in many instances a major operation which may bring serious complications from the effect of which an already overloaded nervous system may be a long time in recovering, and so I say to all dentists: "Be sure you are right before going ahead."

What I would have the dentist do, looking at him from a doctor's standpoint, would be, in cases being submitted for his examination, to not only look at the mouth and the teeth, for disrupted molars, pus pockets and existing cavities, but also whether or not this individual is in such a physical condition as to warrant procedure, and in all cases, where there are serious complications, it is only fair to refer such cases to the doctor before action is taken.

I wish it were possible, and I think it absolutely necessary for the best interests of the profession that dentists individualize their cases more carefully, that they look upon them more as a composite machine than from the special standpoint of the disorders of teeth and mouth.

In my experience I have found pus deep in a tooth that has kept my patient off mental balance for months at a time because a filling was poorly made. In such cases I charge that the dentist does more harm than he does good, and so I would impress upon you that your duty lies along the line of very careful mechanical procedure when operation really becomes necessary and always refraining from operation until the entire situation relative to the patient is fully understood. This can be easily accomplished through your intimate relation with the doctor, to whom the case should be referred before proceeding with such plans as you have in mind.

I would charge you that it is just as easy to overdo in regard to the treatment of teeth as to underdo and that the real dental surgeon, the man who has and maintains a reputation as an individual of distinction in his profession is that man who reviews every aspect of his case before he attempts to give relief by mechanical methods.

Time has demonstrated and thousands of cases show that many of the serious complications which affect the health of individuals come from defective teeth, but many unfavorable end-results show that consideration of the teeth alone is not sufficient to overcome the malady that should be served by extraction or other dental surgical procedure, and that promises without full understanding are unwarranted.

We have come to the time in the history

of the affairs of mankind when we know that much of disorder, much of bodily pain and inconvenience, much of predisposing cause and serious organic disease is associated with affections of the teeth; but we do know at the same time that there is a liability of carrying the subject of dental interference too far if carried on without careful consideration of concomitant conditions.

Therefore it is highly important that there should be the closest co-operation between the doctor of medicine and the doctor of surgery.

In medicine we recognize among the threatening factors of the times the impostors who advertise themselves and their various methods of healing. The same is also true of dentistry; there are the unscrupulous who discredit the profession.

If dentistry is really to stand the test of time, and if medicine is to accomplish what it should, they must be grounded upon principle and that principle must be one great objective; and that objective the best final end-result in every case that comes for consideration.

I would remind you that end-results in any case are measured not alone by the immediate effects but by after consequences. Therefore let us be careful in claiming results and taking credit until sufficient time has passed to warrant your claims. How often have I seen people who have been promised much by a dentist because of some service he might render, which promise was groundless and should never have been made and never would have been made if by closer affiliation with the family doctor the subject had been better understood. Close co-operation and intimate relationship should always exist between these two professions, both of which should have as their ideals the greatest service that can possibly be afforded to sick humanity.

Medicine has become a science; dentistry one of the greatest of mechanical arts. In the hands of the two is the welfare of many an individual whose career may be hampered, whose health may continue impaired, thereby making incompetent those from whom the joy of life is taken because of affliction which cannot be thrown off or gotten rid of without medical and dental co-operation.

The real thought which should possess the mind of every dentist when a patient applies for observation, is: "How can I render the best service possible to this individual? Let me be sure that I have knowledge of all of the conditions which affect, surround and influence him. Let me be sure that I do not promise too much; and, finally, let it be my determination to so deliver, that all professional obligations may be redeemed in results achieved."

If this were to be the understanding with one's self, if this should be the ambitious goal of accomplishment for each practicing dentist, then time would record of this day and age a history of Twentieth Century Dentistry that would be most worthy.

After all, it is the fundamental principle of righteousness which gets us on in the world as citizens and as individuals.

I should say in closing this brief statement of generalities that it is proper that the dentist should have the widest and best fundamental knowledge of the entire human machine, that he be taught to reason to favorable conclusion every case which may apply to him for relief; that he look upon the subject coming to him for dental treatment as a subject to whom he should render only favorable service. I would have him confer with colleagues of the medical profession, bringing about an intimate relation between the two whereby the interests of the one might well advance and promote the interests of the other.

I am so firm in the conviction of the importance of the dentist as relates to

medicine that an institution at Marion, Ohio, where only mental and nervous diseases are treated, has on their staff a dentist who gives of the best of his dental experience, observation and training, goes over every case that presents itself at White Oaks Farm, and gives to the chief physician his report upon his findings, and advises what in his opinion is the proper thing to do. This becomes a part of the history and record of the case and, in the summing up of the case for the course of treatment to be pursued this information is taken carefully into account, with the result that in my personal experience our greatest collaborator is our dentist.

I believe that doctors and dentists should proceed hand in hand in their various lines of work, and I am here to encourage a combination of medical and dental associations. The fulfillment of such an ideal will bring about a more extended field of usefulness for both doctor and dentist, and all suffering mankind will be the beneficiaries.

FOCAL INFECTION IN RELATION TO ABDOMINAL SURGERY, WITH SPECIAL REFERENCE TO ULCERS OF THE STOMACH AND DUODENUM, APPENDICITIS AND CHOLECYSTITIS

By CHARLES S. WHITE, M.D., F.A.C.S., Washington, D. C.

(Read before the National Capital Dental Society, December 5, 1922)

IT IS within the memory of all of us that the term focal infection came into use, and it has seemed as time goes on, to occupy a more important place in the etiology of the disease. Yet, it is doubtful if we really comprehend the full possibilities and significance of the phrase. It is not unlike Mark Twain's reference to the weather, when he said "Everybody talks about it, but nobody does anything about it." We speak of focal infection as a cause of disease, much as the previous generation of physicians talked of biliousness. It is time to get down to a real working basis and supplant hypotheses by salient facts. It is generally conceded that infections remote from the surface of the body are blood borne, but many believe those connected directly with the surface or with the gastro-intestinal and respiratory tracts are due to direct infection by contact with an organism on these surfaces. No one in this country has done more work on focal infection than Rosenow of the Mayo Clinic. He has shown that it is impossible to produce ulcer of the stomach by the ingestion of streptococci or staphylococci and he has been unable to produce appendicitis by direct application of the organisms, yet he can produce appendicitis by injecting intravenously certain strains of streptococci obtained from the teeth or tonsils. Ulcers of

the stomach, appendicitis and cholecystitis are not due to swallowing organisms, but by the entrance of organisms through the blood stream. The source of the infection is often a neglected pyorrhea. Depending on the strain he uses, he can produce appendicitis, cholecystitis or ulcers of the stomach, almost at will, through the blood stream.

From the teeth to the appendix, by the anatomical route, is about twenty-five feet, but surgically speaking, it is not a far cry. There is a very definite relation between the two. Rosenow has been able to produce in one hundred and sixty-eight animals, ulcer of the stomach or duodenum in sixty-eight per cent by intravenous injection of a certain strain of streptococci; in forty-one animals—in eighty per cent he produced cholecystitis with a definite cholecystitis strain, and in seventy-one animals he produced appendicitis in seventy per cent with the organism which apparently has a selective action on the appendix. The conception of appendicitis and cholecystitis by extension from other inflamed areas has little foundation and we are reassembling our facts and evolving a newer etiology for these diseases. Clinical observation confirms the laboratory research. It is almost a daily observation that gastric and duodenal ulcers, appendicitis and infection of the gall-bladder lack a causative agent in the nature of infectious disease and traumatism, but, in their stead, we know frequently a mouth that fairly reeks with pyorrhea. The wonder is that so many escape this serious surgical disease with such intense infections in the mouth. Physicians are more and more practicing preventive or prophylactic medicine; they are indeed, sanitarians. Much could be done that is at present neglected. Tonsils receive more than their share of attention. The teeth are outlaws which are passed unnoticed in a zeal to fasten the crime on the succulent tonsils. We overlook the murderer to catch the petty thief. If we would exchange the stethescope for a tongue depressor, the public would be benefited. An examination of the teeth is just as important as the examination of the heart, but do we do it as well? We do not. The search should be made about the teeth and gingiva by the eye, the platinum loop and the x-ray. It requires care that the average physician has not cultivated, and, in many instances, he needs the assistance of a competent dentist. Here is a common ground on which both can work with perfect harmony to the everlasting welfare of the patient. There should be more consultations between the two professions.

Just as we surgeons have unwittingly, and perhaps somewhat ignorantly, removed perfectly good appendices, so have dentists removed perfectly good teeth. It can be said to the credit of both that this error is ever diminishing. We believe that there are good and other kinds of dentists. There are men in the dental profession who are not either competent to make or read x-ray films or attempt oral surgery however much they are invited. This is relatively true of the medical profession, but with better teaching, earnest application and diligence of members of both professions this condition will not long survive. We realize that too many tonsils are removed and too many teeth are extracted. If we expect to reduce surgical infection in the abdomen, we must look above the diaphragm. Open the mouth and keep infection out. Co-operation on the part of the dentists and physicians will reduce the morbidity and mortality. While the results may not be evident at once, the next generation will reap the benefit of the concerted action. We are "Our Brother's Keeper" and we must direct our energies in that direction.

Discussion

Arthur B. Crane, Washington, D. C.: The papers which have been presented by such eminent members of the medical profession

give abundant evidence that there is a crying need for a closer co-operation between the doctor of medicine and the doctor of dentistry. Such joint meetings as this should be the rule and not the exception.

It is a relatively short time since the first school for dental instruction was established. Those far-sighted men who then conceived the fact that dentistry was an important part of the art of healing, at first attempted to have dental studies added to the curricula of the medical schools, but the medical educators were so unresponsive to this suggestion, that it became necessary, in order that dentistry could be placed upon a professional foundation, to establish dental education upon an independent basis, leading to a distinctive degree.

For many years, following the birth of dentistry as a profession, the doctor of medicine and the doctor of dentistry each traveled his own way, getting apparently farther and farther apart, until the startling condemnations of Hunter and others awakened the medical and dental professions alike to the possibility of mouth infections as a factor in metastatic infections.

When the two professions attempted to get together to discuss ways and means of controlling mouth infection and its ravages, it was discovered that an entire readjustment was necessary in order that they could understand each other. The dentist found that he must go back to the beginning and readjust his technic upon the basis of anatomy, physiology and pathology, while the physician found that he could no longer ignore the condition of the teeth.

With the prosecution of the Great War, however, came at last the great opportunity for the dentist to demonstrate the intimate relation which a healthy mouth bears to a healthy body. How well this opportunity was grasped has been told by General Sawyer in his excellent paper.

Today the doctor of medicine, who ignores the seriousness of mouth infections is conspicuous because he is the exception. Nevertheless it is a sad commentary that the doctor of dentistry has not been taken into full fellowship by the doctor of medicine. While it is true that physicians commonly refer to the dentist cases in which they suspect the mouth as an etiologic factor, yet consultations as they are conducted between members of the medical profession are rather the exception. The tendency too often is for the doctor of medicine to expect the doctor of dentistry to work under his dictation.

Medicine as compared to dentistry is an old and honored profession. It has its ages of experience, its traditions, its thousands of hospitals, its many establishments for scientific research, the co-operation of every civilized government and best of all the unlimited confidence of the general public.

Dentistry, on the other hand, is a comparatively new profession. We are struggling upward, looking for the light. We are thirsty for knowledge; we have the highest ambition to serve humanity; we believe that there is a service which we can render in conserving the health of mankind.

We come to the medical profession, then, not asking that we be made doctors of medicine, nor that they become doctors of dentistry, but that each of us in our own fields may endeavor to work in co-operation, recognizing our inter-dependence, to the end "that all professional obligations may be redeemed in results achieved."

Sterling V. Mead, Washington, D. C.: It is not so long since the ill-health caused by dental involvment was attributed to caries; then pyorrhea was blamed for most varieties of oral sepsis. But the whole subject was not placed upon a truly scientific basis until the routine examination of the teeth by efficient x-ray operators showed that apical alveolar areas of infection, often well hidden in bone structure and not giving rise to any subjective or objective symptoms whatsoever, would sooner or later cause the appearance of pathological conditions in even the remotest portions of the body.

There is much difference of opinion as to what constitutes oral sepsis, and as to whether pulpless teeth may often be left in the mouth to advantage. A tooth from which the nerve is removed is not a dead tooth, nor a devitalized tooth. The tooth receives nourishment from two sources, the periodontal membrane and through the apex. When the pulp is removed, there is still a source of nourishment through the periodontal membrane. The tooth is not, then, a foreign body. When a tooth is extracted and replanted, both sources of nourishment have been destroyed, and there will be absorption of the root. The pulp of a tooth is the formative organ of the dentin and is transitory. If one lives to very old age it disappears; the tooth still lives since the cementum of the root receives its nutrition wholly from the periodontal membrane. The death of the pulp affords opportunity for apical infection, but if upon removal of pulp the root-canal is aseptically filled, infection does not usually follow. It is not uncommon to see instances where pulpless teeth with no pathology shown are condemned and extracted and other vital teeth with definite periodontal lesions retained in the mouth.

A great source of misunderstanding be-

tween the medical and dental professions is the prevalent practice of referring patients to x-ray laboratories run by technicians who have no knowledge of dentistry. A report is sent to the physician, and he in turn orders the extraction of certain teeth based upon the report from such laboratory. The necessity for extraction cannot be determined by the lay technician, nor by anyone from radiograms without clinical support.

The medical profession should not overlook the value and the advantages of nature's own teeth, and should remember that no artificial restoration can really equal the tooth which has been extracted. The loss of a tooth involves the following considerations: 1. Masticatory efficiency impaired; 2. Elongation of opposing teeth; 3. Tipping of teeth, either side of vacant space and bodily drifting; 4. Resorption of surrounding tissues; 5. Prosthetic restoration inferior to nature, from standpoint of utility and esthetics.

The medical profession, therefore, should not attempt to sacrifice teeth without due regard to their usefulness and positive assurance that they are causing general disturbance. This decision should be left to members of the dental profession.

On the other hand, the dental profession should more fully appreciate the position of the physician's interest in the welfare of the patient and understand more fully the evil effects of focal infection in the light of systemic disturbances. The dental profession is not in a position to attempt to diagnose general ailments and to endeavor to trace these conditions to the teeth, but should be able to determine accurately, and make an intelligent report, as to all pathological and contributing causes within the mouth when there is systemic trouble, and the probability of their being the source of a general infection or general derangement of any kind, and, more important still, positively to eliminate all dental sources of systemic disease.

Many physicians who fully believe in the teeth as a source of general disturbance are often handicapped in their efforts to eliminate oral sepsis by the hostile attitude of some few members of the dental profession who have contrary opinions. When the general health of the patient is at stake, and it is the opinion of the attending physician that the condition of the mouth is the cause, or an aggravating cause, of a systemic condition, or has even a suspicion to this effect, it should be the duty of any member of the dental profession to whom the patient is entrusted to be absolutely sure of his ground before expressing a contrary opinion, and to do this only after a most careful and painstaking examination, and in doubtful cases when practicable by a conference with some other member of the dental profession.

There is undoubtedly too much haphazard examination of the mouth and an inclination to look too lightly upon these areas of oral sepsis. When we recall the many fads in medicine and dentistry and the many radical theories long ago forgotten, it is not hard to see why many in both professions are skeptical regarding the effects of oral sepsis upon the general system. However, those who see more and more of this class of work and note the improvement in general health when the oral foci are removed, feel most strongly that we are dealing with facts, and not with theories.

Prevention, rather than restoration, is the goal toward which the dental and medical professions are striving. Each profession has its own separate field of usefulness, but the best results are obtained by close co-operation of both professions.

THE DENTAL ASSISTANT OF THE FUTURE[1]

By JULIETTE A. SOUTHARD,[2] New York, New York

IN ORDER that my readers may arrive at a common understanding and view my subject from the same angle, I am going to ask this question: What is the object of the dentist in practicing dentistry? I am sure that could every practicing dentist answer this question he would, with little variation, state the following: "First, I am practicing dentistry to earn a sufficient income to provide for the needs of a comfortable living for myself and those dependent upon me, and also to provide a competency so that I shall not become a public charge should I fall a prey to illness or the infirmities of old age. Second, I am practicing dentistry because I believe it to be an honorable calling, one whereby I may render to my fellow man a true service, a service that will make him feel that because of my effort he is made better and is glad I have passed his way."

Having established the fundamental reasons for practicing dentistry we will consider the five essential things that constitute the capital of a dentist: Health, professional education, personality, equipment and assistants. Of the first four I shall not elaborate in this article, you will appreciate their importance if you take the time to consider them individually, but of the fifth or last I will endeavor to bring to your minds a relationship and importance which so many dentists have overlooked or at least improperly considered.

It is a well-known principle in business, whether professional or commercial that time is money, and nowhere is it better exemplified than in the practice of dentistry. For the sake of argument we will assume that the dentist places a value upon his earning capacity of $6.00 per hour, or ten cents a minute, for the time consumed in direct operative service to the patient. For many dentists this fee is much too conservative, it can be multiplied to suit individual requirements. If the office receives six telephone calls a day, at a low time estimate of two minutes devoted to each call, this totals twelve minutes amounting to $1.20 a day or $7.20 a week. If service is rendered on an average to twelve patients a day, the time consumed in getting them in the chair, making appointments, collecting fees, dismissing them, etc., will occupy at least six minutes per patient, amounting to $7.20 a

[1]Voted, That the recommendation of the Board of Trustees be adopted, that dental hygienists, dental mechanics, and dental assistants, except associations for profit, be encouraged to establish associations in their respective states, and that they be given conference relations with the American Dental Association, state societies, and subsidiary organizations, the details of which are to be formulated by the Committee on Dental Education on conference.—Minutes of House of Delegates.

[2]President, Educational and Efficiency Society for Dental Assistants, First District, New York.

day or $43.20 a week, making altogether for these two items alone of lost time, approximately $50.00 a week. There are telephone calls that come to the office which the dentist must answer personally, but these are in the great minority and most offices have more than six calls a day. Also there are patients to whom the dentist must devote personal attention but they do not constitute the majority and many offices see twenty or more patients daily. I purposely make my estimates very conservative.

Another phase of dental office routine which means a great loss of time and finance and which proves one of the most trying ordeals for the dentist, is the collection of fees. This is a very delicate subject; there have been many articles written on this phase of office conduct, but I wish to emphasize that once the preliminary arrangements have been completed with the patient by the dentist, he should never have to refer to or mention fees, as nothing so cheapens his dignity.

Having established the fact that time is money, and that the sole income of the dentist is derived from time he devotes in service to his patients at the chair, the importance and necessity of eliminating waste time and increasing the income producing hours cannot fail to be apparent. But, you will ask, who is to do this? Am I not right in replying: "The efficient, trained, dental assistant." She is the one who will answer the telephone and sift out the calls which are really personal or which should come to the attention of the dentist. She is the one who will care for the patients as they come in and go out, make the appointments and collect the fees. She is the one who will care for the many other sources of time lost which accrue during the day's work. She will mix the cements, amalgams, synthetics, develop and mount x-rays, and do many simple laboratory duties and some that are not so simple.

The education of the public, the advance in the standards of dentistry and the demand for the highest type of dental service, carry with them responsibilities which can only be met by the man who is freed from the distracting and annoying detail routine of the conduct of his office. This brings clearly to view the possibilities of the dental assistant, and to mind that, as the profession of dentistry advances so must the education, ability and service of the dental assistant advance. If the dentist is to be aided in his service to humanity, as his profession demands he should be, he no longer can tolerate the inefficiency of an assistant who is uneducated, careless, apathetic, without interest in her work. Such an assistant is costly at any price. If this person be replaced by one who has a reasonably good education, who possesses mental alertness, who understands human nature to a reasonable extent, who has sufficient tact to handle difficult situations, who is loyal to her employer, who is interested in her work, who receives remuneration no less than she would receive in another calling for similar qualities, you will find a complete change of atmosphere brought to the dental office.

In the inefficient type of assistant heretofore mentioned is never found steadfastness of purpose and careful attention to detail; true loyalty, that quality so essential to the interests of the dentist will also be lacking, for the very good reason that this type cannot understand their personal welfare and therefore cannot understand that of her employer. In the educated, alert and tactful individual their preliminary training, mental aptitude and recognition of their responsibility to their position, plus reasonable

compensation for services well performed, assures loyal support in the conduct of the practice. However, we must fully appreciate that the loyalty of the employe can only measure up to the loyalty of the employer, or as might be said in the vernacular, it should be "fifty-fifty." The educated, refined assistant is never a servant, and should never be treated as such. She is a co-worker and an associate in the successful administration of the practice as well as the hostess of the office.

The dentist seems to more easily fall into a rut than any other professional man I know of, perforce of his occupation which limits him day after day to the confines of the four walls of his office, or rather operating room. Few of his patients criticize him directly but many voice their opinions to the assistant and if she is the woman we have pictured, her resourcefulness will smoothe over many difficulties and adjust many differences which otherwise would prove disastrous to a successful practice. Some one has aptly said that "a rut if dug deep enough becomes a grave"; this is but too true and I would like to add, the grave of visions, ambitions and ideals.

Inasmuch as the conduct of each office must be determined by the requirements of that particular practice, I am not going to attempt to give you a detailed recitation of the numerous and varied duties which accrue to the assistant in the daily routine of her work, these have been enumerated over and over again in articles published in the dental magazines. Suffice it to say that the intelligent person will soon acquire the necessary knowledge and will keep adding to that store. I will say that the best assistant that can be secured is never too good. Could I but speak to every member of the dental profession, it would be much in this fashion: "Doctor, do not pin your faith to the sweet young thing just out of school if you expect to have stability of purpose. Seek in the various fields of business the competent help you require; in the bank, the lawyer's office, the publisher's office, or the office of the head of any industry or large business. It is here that the woman of capacity is always found, whose compensation measures up to her ability. There are no bargain sales in brains. Some of the best assistants we have today in the dental profession have been drawn from places such as I have mentioned."

I am not a seer, but I prophesy that in the not far distant future the day of the registered dental assistant will be with us. As time goes on the public is being more fully educated in hygiene and health and the day is not far distant when patients will demand a registered attendant in every dental office: one trained to meet any emergency; one who will thoroughly understand anesthetics, first aid, surgical aid, etc. At the present time people of refinement and judgment expect a woman attendant in the dental office and comment very unfavorably upon the offices lacking in this respect. Until very recently the preliminary education of a dental assistant was not felt to be of any special importance; however that time has passed and we find today in several of the western universities, departments organized or being organized for the proper training of women in dental assisting. Substantially the course in each of these institutions is the same and comprises instruction in office management, bookkeeping and records, operative assistance, prosthetic assistance and laboratory, asepsis, oral hygiene, anesthesia, radiology, a certain amount of dental anatomy, chemistry, materia medica, bacteriology, physiology, ethics. Thus it is seen that this phase

of dental activity is receiving recognition.

In addition to the courses just mentioned there have been formed a number of societies for dental assistants in various states. Of the conduct and the workings of these societies I cannot here give you detailed information except to say that there is a general endeavor to educate the dental assistant along lines which will better fit her for her duties; they have for their purpose a broad educating effect for a vision of bigger and better service to humanity.

To put into practice a new idea creates a tremendous amount of work, attention to detail, some opposition, and not a little speculation relative to ultimate success, but I know of nothing that can prove of greater benefit to dentistry than the properly supervised education of women who desire to enter the calling of dental assistant.

The "office girl," as she was known once upon a time, is fast disappearing; dental societies and increased dental education have opened the way for the dentist into new fields, his vision has broadened and his association with his fellow practitioner has taught him that co-operation and the interchange of methods and ideas have builded his profession into a branch of the medical art which is of untold value to mankind; the dental assistant of the future is the outgrowth of this development. She will be the supplementary brain and fingers of the dentist, her greater development will make for her a place in the practice of dentistry worthy of her best endeavors. We who are but the pioneers in this great movement for efficient service will have builded better than we knew for the glory of the dental profession.

DENTAL ECONOMICS WITH SPECIAL REFERENCE TO INVESTMENTS

By C. N. JOHNSON, M.A., L.D.S., D.D.S., M.D.S., F.A.C.D., Chicago, Illinois

(Read before the Nebraska State Dental Society, Omaha, May 14, 1923)

SO MUCH has been written on the subject of dental economics in recent years—some of it from such an unfortunate point of view—that it is with some degree of temerity that I approach this topic. And yet it must be reckoned with in the practical affairs of our professional life, and it is, therefore, well that it should be considered calmly, conservatively and with due regard to an equitable relationship between patient and practitioner. No system of economics can ever be permanently successful which does not take into account the point of view and the ultimate welfare of both parties to every transaction. This is fundamental.

Much of the agitation on practice building and money getting which we have encountered of late has had little to do with equity and justice, but has had a great deal to do with the exploitation of the people. This is so elementally wrong that it should be frowned upon by all honest men. It will inevitably bring its own reward, as has so abundantly been proved in many concrete instances. I am inclined to make the emphatic statement that I have never seen one single instance where a man has been successful for any length of time, financially or otherwise, who has followed the methods recently advocated by some of our lecturers on this subject. To seat a patient in the chair with the pronounced, deliberate and preconceived idea of at once beginning a "service selling" talk—a talk on the finances of the operation—is unprofessional, degrading and wholly out of place. It presents the wrong point of view for a professional man. It lowers the dignity of the profession, and whatever may be said, dignity is a very real and concrete entity in the conduct of professional life. To always harp on fees is demoralizing; to magnify the money side of a professional transaction is to take it out of the class of professionalism, and place it in the category of commercialism.

This attitude of mind among professional men is well illustrated by an actual happening. Several dentists were examining the plaster cast of a jaw with some teeth missing, debating as to the best procedure to supply the lost parts. An acquaintance in the profession came along and the cast was handed to him for his opinion. After turning it over in his hand for a moment his sole comment was "ninety dollars!" Which was a concrete illustration of the mental attitude of many men toward any dental operation. This happened several years ago. If it had occurred today the only variation with this type of dentist would

probably be that he would say: "nine hundred dollars," instead of ninety. The scientific principles involved in restoring lost parts, or the technic of carrying them out, make small appeal to this kind of a dentist compared with the amount of money he can obtain for each operation. And let it be said with the utmost emphasis that the constant concentration on fees, and the ignoring of service, will never turn out economically profitable to any man in any profession.

Nor will it do to continually demand such fees as will produce a constant protest on the part of the patient. Jangling over fees is disconcerting and disintegrating in every respect, and it takes away from our relationship with the public the sweet savor of satisfaction which should constitute the chief joy of our professional service. To illustrate the extreme to which some men are forcing fees one dentist has recently been quoted as saying that unless he received a protest from ninety per cent of his patients when a bill was rendered, he would consider that he was a failure in his business relations with them. This is so fundamentally wrong that I am forced to affirm that if a professional man receives a protest from even ten per cent of his patients, I would consider him a failure not only as an honorable practitioner of a profession, but as a business man as well. Ultimate success, either professionally or financially, was never built on contention, and the dentist who spends much of his time or any of his energy in quarreling over fees is not succeeding in the management of his affairs.

If better fees are necessary in dentistry, as many honest men are claiming, they can be obtained only by first educating the public as to their equity and justice. Again and again it must be emphasized that the only satisfactory patient is the satisfied patient. People must be taught in an open, frank, and honest way that dental service is worthy of a very liberal financial reward. The exactions of daily practice with their constant physical and nervous tension take a toll which should be cheerfully paid for in adequate coin of the realm, and they will be so paid for as soon as the people become convinced that it is right to do so. But they will never become convinced by underhanded methods or misrepresentation. When a dentist tells a patient in justification for rendering a bill of several thousand dollars for a partial denture, that the machine with which he made the attachments cost him $10,000.00, he is going one step further than making himself look ridiculous in the eyes of his profession, he is assuming the attitude of what in the vernacular is a plain ordinary liar. And permanent success was never built on lies.

When a dental supply house puts into print a so-called "service-selling talk" in which is emphasized the psychological advantage which the dentist is enabled to obtain over a patient by seating him in a certain position in the chair before he begins to talk fees to him—a position in which the dentist has the advantage of "looking down" on the patient—the least that can be said is that the writer has utterly failed to grasp the essentials of successful salesmanship, and has tried to promulgate in the dental profession a most damnable doctrine. I cannot frame in words sufficiently strong my intense hatred of that kind of subterfuge when introduced in professional practice.

What then shall be a man's procedure when aiming to educate the people to a condition of mind where they will gladly pay him a legitimate and liberal fee? First, there must be the grounded conviction that he is going to render a character of service that entitles him to a good fee. Without this as the basis for

building fees there can be no maintenance of high fees for any length of time. A dentist must have this conviction himself or he cannot pass it on to his patients. No man can continue to look people in the face year after year and make them believe something which is not true; neither can any man fail to make people believe in him if he is consistently honor bright day by day in his dealings with them. This is the fundamental basis of success in the situation under consideration.

Misunderstandings may arise from time to time in building a new practice, or even in maintaining an old one where patients come to a practitioner for the first time and are unfamiliar with his fees. With people who do not know your methods it is unwise to go ahead and perform a long series of expensive operations without a definite understanding as to the probable financial obligation involved. We all know the difficulty of accurately estimating the cost in advance of certain operations, and yet we can at least give a patient a sufficient insight to enable him to judge as to whether or not he wishes to have the operations made. It has frequently been stated and with truth, that it is better to have an understanding first than to have a misunderstanding afterward. But this does not in the least imply the kind of service-selling talk so frequently advocated of late with the supposed advantage of the chair being placed in a favorable psychological position. It means a quiet, straightforward, kindly consideration of the patient's welfare with sufficient enlightenment as to the relative value of different kinds of procedure to enable the patient to know what is best for him under the circumstances.

One thing is essential—and it is the prime requisite in the management of a practice—that the patient must be made to feel that the dentist has at heart the welfare of those he serves at all times. This need not be done by continually talking about it, but by a constant display of candor and consideration in the discussion of any line of procedure under contemplation.

The great trouble with the whole world is selfishness—the failure to recognize the other man's point of view. It is at the bottom of most family feuds, of most neighborhood quarrels, of most community contention. It was the real basis of the great world war. In professional life—particularly that phase of it which has to do with finances—selfishness is the one supreme sin. If we could all bring ourselves to study the other man's point of view, if we could see how we would feel if we were in his position, if we could always meet the issue face to face on the basis of what was right and equitable for both parties, most of the misunderstanding and contention would disappear like magic.

There is one essential which a dentist should have to make the machinery of professional life move smoothly, and that is a keen insight into human nature. To be able to read humanity like an open book is a great asset in managing a practice. We have all kinds of temperaments to deal with, and a quick intuition as to what the patient is thinking or going to think is a real advantage in maintaining harmonious relations with him. Every dentist should make the study of human nature one of the prime requisites of his professional education; and if he does he will find it not only one of the most advantageous but one of the most fascinating of all his studies.

The ideal business relationship between the dentist and his patients obtains only where there is no discussion whatsoever regarding the matter of fees—a relationship which, of course, can develop only after years of service

in one locality whereby the dentist has so demonstrated his honesty and ability that it leaves no ground or occasion for discussion. To be permitted to go on and do one's daily work under favorable conditions such as these is the acme of satisfactory practice, and it is a condition which every practitioner may achieve if he diligently sets himself to the task of meriting it.

Investments

And now to a consideration of the more practical phase of the subject—the problem of knowing what to do with fees when we get them. It is every man's bounden duty to give this matter some thought. Too frequently in our professional history men have been lax in their obligation in this respect. All of us have known men, and some of us have known many men, who have fared well at the hands of their patients, but who have been so careless and slipshod in the management of their affairs that they have reached advanced age without the wherewithal to maintain themselves and their families with any degree of comfort. Nothing is more pathetic in all professional experience than to see a man who has been accounted successful, and who has given a life time service to his patients, reaching old age under the biting pinch of poverty. The bitter dregs of disappointment and despair have been the portion of too many of our fellow practitioners, and out of the welter of misery and anguish we should each of us gain a lesson—a lesson of providence and preparation. No man who has a reasonably full dental practice, and who is not incapacitated by ill health need reach advanced life without a competence, provided he wisely employs his time in practice, and husbands his resources with a fair degree of intelligence. But here comes the rub. Most professional men display an utter lack of common sense and acumen when it comes to the management of their investments.

Investments in a general way may be divided into two classes—investments for protection, and investments for profit. Under the former might be classed life insurance and a home. No man who has any one dependent on him—and every man should have some one dependent on him—should fail to protect them with some form of life insurance. To be suddenly snatched away from wife and family in early manhood, leaving no provision for their maintenance in the way of insurance, is to work an unwarranted hardship on those who are, by all the ties of kin, entitled to protection. Life insurance is made so attractive in these days that it should at once appeal to the professional man. It is safe and equitable in its provisions, and it offers various plans for consideration. There is one kind of life insurance though which seems to me ill-suited to the average dentist, and that is the straight life which calls for payments during the entire lifetime of the insured. This sometimes throws on an old man a burden which he is not prepared to shoulder, with the results that a policy which has been carried for many years is frequently allowed to lapse or be hypothecated at a definite loss. A short term policy—one in which all the payments are made in a given number of years— while more expensive, is altogether preferable for a professional man. The burden comes at a time of life when by natural vigor it may most easily be borne, and the maturing policy may be made available for support during his declining years or made payable to his family at his decease. Meanwhile he has the comforting reflection that in case of sudden death his family will have some resources.

As to investing in a home there is much diversity of opinion. The cool,

calculating business man will tell you that it is cheaper to rent than to own your own home, and will prove it to you by figures so adroitly computed as to be most convincing. But with this kind of an argument I have no possible patience. Granted that figures prove this, and that sometimes in a large city it is not expedient to own your home, yet the general statement holds good that in most instances where dentists have succeeded well financially they have usually been owners of homes. It may not appeal to the hard-headed investor to put money into a home, but there is something about owning a home which serves as a greater asset in life than the mere piling up of dollars. The home is essentially the concrete unit of our highest civilization, and other things being equal the man is a better citizen who lives in his own home than the one who occupies the property of another man. To own a home is to increase one's responsibility and interest in the community, and to make for solidarity and self-respect. There is something wonderfully comforting in having one certain spot on earth where one may plant a firm foot and defy the world to dislodge one. And there is a sentiment in the home which sweetens life and lends a fragrance to our daily task. The home is a fortress against the buffets of the outside world—a citadel wherein the weary worker in the vineyards of the land may repose in perfect peace.

But it is with respect to investments for profit that most professional men go wildly astray. An entire essay might profitably be written on this one theme, but a consideration of a few of the most significant things must suffice. Hidden in every man's nature there is the irresistible desire to want to better his condition financially; and this is laudable unless it becomes a mania, or a foolish obsession. The professional man has not gained a very enviable reputation as a sane and level-headed investor. Too frequently he has contributed liberally to the coffers of the wildcat speculator or the unprincipled promoter. The time has come when every man writing on this topic should put in capital letters a most emphatic warning to professional men against thus squandering their hard earnings. Why it is that after all that has been said on this subject dentists may be found who continually chase the gold at the end of the rainbow? Why it is that the younger men cannot learn from the experience of the older men, or why is it that the older ones sometimes continue to do such fundamentally foolish things?

The allurements of the "get-rich-quick" idea seem to get into the blood of otherwise sensible men and to make of them the merest children. They hear of the immense fortunes that have been made from small beginnings, and there is apparently only one way to prove to the average professional man that he cannot step in and duplicate these experiences. Only by the bitter process of paying out hard earned money and seeing it vanish into thin air can he be brought to realize that the basis of the "get-rich-quick" idea is wrong, and that even if it were right, it is not in the accumulated experience of the past that the professional man has ever been able to take advantage of it. It is not in the nature of things that he should. His interests and connections do not bring him into contact with the evolution of great financial developments.

The hardest lesson for the average professional man to learn is that he should be content with small profits and safety. Small profits have a dull sound to his ear—there is nothing spectacular or alluring about them. They bring no immediate vision of rolling around in a Pierce Arrow or a Packard—and yet let

it be said with the utmost emphasis that they will unerringly lead to these luxuries in the end more certainly than will ninety-nine out of a hundred of the spectacular enterprises held out for the professional man's eye.

What then shall be an advisable investment for the dentist? Surely not speculating of any kind. Buying stocks on a margin, or oil on a prospect, or orange groves several thousand miles away, or plantations in Mexico or similar ventures do not range themselves within the category of conservative investments for professional men. Fortunes are sometimes made in these enterprises, but the chances are a thousand to one that the dentist will not be found on the winning side.

Investments must be governed somewhat by the locality in which the dentist lives. Probably the safest form of investment yet devised by man may be found in bonds and mortgages—but all bonds are not safe, nor are all mortgages profitable. As a general rule, the dentist would better select an honest and capable business man, such as a banker or bond broker, and consult him about his investments. Expert advice is as logical here as in professional life. You would have little respect for a banker who attempted to fill his own teeth—you would know only too well what the result would be. And yet he would make no more foolish moves than do many of our dentists when they essay to invest their money. In rural communities farm mortgages make a convenient form of investment, but a good rule to follow is never to invest in a mortgage on a farm that you know nothing about, and never advance more money on it than you would willingly pay for the farm and take it over for your own property. Values of land—as stable as they are supposed to be—go up and down with other commodities, and you must reckon on this when you put money into mortgages.

Stocks in good reliable concerns are sometimes an acceptable investment, but the professional man should indulge in them somewhat guardedly. Above all things he should never buy stocks on a margin. There is too much gamble in it, and he cannot afford to have his mind diverted from his professional duties by watching the ticker on stock market reports. Let him buy his stock outright, place the certificates in a safe and forget them—going about his daily duties as if he did not own any stock. Some quiet evening in his home it may be interesting to pick up the paper and see whether his stock has gone up or down. It will prove interesting in either event. After he has acquired a reasonable competence, so that he can afford to accept a loss without much disturbance, he may buy and sell stocks, if he wishes the diversion which this is sure to bring—but again—never on a margin. In buying and selling stocks do not follow the crowd. Keep your feet on the ground. If stocks get to soaring to high heaven and everybody is buying, that is the time for you to sell. When gloom settles over the land and stocks go tumbling down, down, down—when everbody has the theory that the country is on the skids for the nethermost depths of destruction, that is the time to buy. The country has never yet gone to destruction, and it never will unless we follow the example of ancient Rome or modern Russia.

If you deal in stocks do not try to be a wizard and always buy at the extreme bottom or sell at the extreme top because it cannot be done. Let the other fellow have some of the profit. No man is wise enough to know when either the peak or the pit is reached. I once heard of a wealthy man who had made his money dealing in stocks, and when asked

how he did it he said: "By not trying to always sell at the top or buy at the bottom." Be content with a reasonable profit.

And speaking of profit—here is one fundamental thing for the professional man to remember: When you make a profit, whether in the way of a rise in stocks, or coupons on bonds, or interest on mortgages, or dividends, *never use that profit for current expenses.* This is fundamental if you wish to accumulate rapidly. Re-invest that money, and start it earning more money for you. You lived and paid your expenses before it came to you, and you can live without it again. If you follow this policy, I can promise you without equivocation that you will readily accumulate a competence, and be able to approach old age with perfect serenity so far as finances are concerned.

One thing more—do not imagine that you can invest money without sometimes suffering a loss. You are human, and the enterprises in which you invest are managed by men who are human, and losses will occur. When they hit you—smile. It will do no good to weep. If you have exercised care and have done the best you could, be philosophical enough to accept the outcome. Remember, you made your money out of the air, and the air is still here. If you invest along the lines recommended in this paper, I think I can confidently assure you that your profits will far exceed your losses, and when a loss does come it will not cripple you.

The science of making and saving money is, after all, a very simple one. Professional men have sufficient intelligence to master this science if they only apply themselves to it. It is my conviction that the time has come when as honorable, self-respecting citizens, the dentists of this country should approach the study of economics in a more systematic and a saner manner than they have in the past, to the end that we shall be known as a profession of level-headed and responsible men rather than as easy marks for every unprincipled promoter.

I want to see my profession rise in the esteem of the world, and one of the means to this end may be found in proving to the world that we have some judgment in the management of our practical affairs. I invite you to a closer consideration of this most important subject, with the promise that it will bring tangible returns not only in a material way, but in self-respect and ultimate happiness.

AN UNUSUAL CASE OF ALVEOLOTOMY

By MENIFEE R. HOWARD, D.D.S., Denver, Colorado

(Read before American Society of Oral Surgeons and Exodontists, Los Angeles, California, July, 1922)

THE patient in this case was only twenty-one but she looked every bit of forty years old. She weighed eighty-two pounds, was married and the mother of a three-year-old girl. Her face and features were not good to look upon, rather repulsive.

After talking to her, I soon made up my mind, owing to her dress, personal appearance, etc., that the charms of life had little or no attraction to her. Nature had been a little unkind (really nature had almost ruined her). She seemed to be bordering on a general breakdown physically, very nervous, tiring easily and no resistance. From the mental point of view she was down in the depths, taking little interest in anything and bemoaning her fate.

All her plight seemed to center around a malformation of the mouth, evidenced by a protrusion of the teeth and lips, much like pigs' teeth. Owing to the extensive protrusion, she could not close her lips and had not been able to close them at any time in previous years that she could remember. This caused a dry, uncomfortable condition of the mouth and one predisposed to infection.

Upon examining the patient's mouth, I saw the most unusual condition I had ever witnessed. The arches were constricted and the gums hypertrophied out of all proportion. The teeth on both the upper and the lower jaws were scattered about the mouth, lying in almost all positions except upside down. The lower teeth on each side, actually extended horizontally across the mouth, interfering with the normal position of the tongue. There were thirty-two teeth in the mouth, but no tooth was touching the other in its position in the jaw, and when the jaws were in occlusion not more than two or three teeth touched each other. The abnormal hypertrophied gum tissue covered most of the crown surface so that only the tip end of most teeth were exposed. Because of this condition mastication was accomplished mostly upon the gums. By pressing the finger on the gums almost any place in the mouth several drops of pus could be expressed.

In the patient's endeavor to close the lips, pressure would be made on the gums so when she opened the lips in talking or smiling little yellow drops of pus would exude which was very disagreeable to look upon.

I was desirous of knowing the reason for this unusual condition, so I delved into her past history. A complete physical and laboratory examination was made, impressions and radiographs were made of the teeth and jaws. In question-

ing as to her earlier history, she said that during early childhood she had had considerable stomach trouble and that

Fig. 1.—Before operation.

five years ago had an infection on the right arm which caused necrosis of the bone of the arm and the marrow had to be scraped and curetted and that she

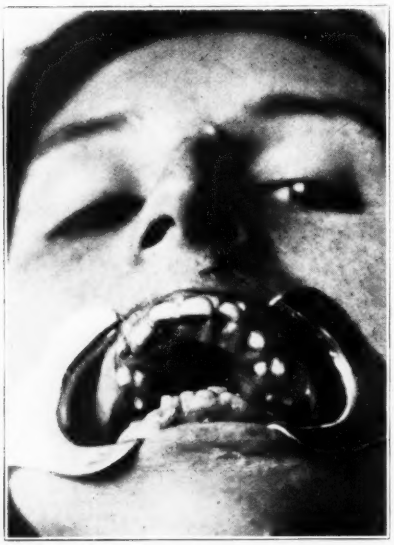

Fig. 2.—Showing hypertrophied gum tissue.

almost lost her right arm. From all the information obtained, this infection was of streptococcal origin and was caused by infection from the mouth. Three years ago an operation was performed on the upper front teeth to expose their crown surfaces which up to that time had been under the gums.

The patient's child had some of the same tendencies towards hypertrophied gum tissue and abnormalities that the mother had. The father of the patient was a small, undernourished man, having this same abnormal condition of the gums as the daughter. He died at the age of twenty-eight, without any particular history being made of his case.

A physical examination made of the patient by Dr. Ward Burdick, showed negative except for scars and osteomata on right humerus; also malformation of the jaws and teeth. Enlargement of the Thyroid gland, blood pressure systolic 120-diastolic-80, Wasserman negative, haemoglobin 75%-white blood corpuscles 11,600-red blood corpuscles 3,744,000, Urine sp.gr. 1013, no albumin, sugar or acetone, no casts, luetin test negative, pus from mouth pure streptococcus viridins. This report makes it evident that the patient had a marked anemia with a deficiency of red blood cells.

A. H. Ketcham made photographs of the case from four different positions (Fig. 1). The side view shows the extensive protrusion. The sore on the lip of the patient was of periodical oc-

currence caused by the infection in the mouth (Fig. 2).

Impressions of the case were taken and it was a difficult problem to take an impression of the lower teeth without

Fig. 3.—Models of upper and lower teeth showing malpositions and hypertrophied gum tissue.

removing some of them on account of the horizontal position. A picture of the models showing the biting surfaces made from the impression is represented in Figure 3, and presents the various positions of the teeth and the hypertrophied condition of the gums. From a lateral view the models present the extensive protrusion and posteriorly only gum tissue can be observed (Fig. 4).

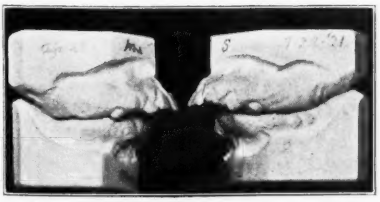

Fig. 4.—Lateral view of models of upper and lower before operation.

The radiographs disclosed the imbedded and impacted teeth and suggested the extensive areas of infection from pyorrhea, abscesses and cysts. The jaws, both upper and lower, show an atrophied process with the lower jaw very weak. Figures 5 and 6 show the film pictures of the teeth.

Radiographs taken under the jaw of the lower show the right angle or horizontal position of the lower first molar and second bicuspid on each side. The protrusion of both the upper and lower jaws is clearly outlined from a profile radiograph (Fig. 7).

After making as full an investigation as possible, it was decided the case was one of heredity, the ancestors having undoubtedly transferred the condition down to the third and fourth generation.

This condition was causing extreme

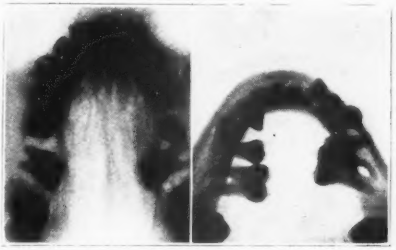

Fig. 5.—Film pictures of upper and lower teeth.

physical disturbance to the patient, making her subject to any ills and gradually weakening her body and reserve force. It was interfering with her mental condition, so that her actions were those of an old woman and she did not have the dreams and plans of a normal individual at the age of twenty-one, as life offered rather a miserable existence. I called in a pyorrhea specialist to see what he could do with the case and he said that the case was beyond any hope of relief at his hands. I asked the orthodontist and he assured me that it was beyond any hope of correction. So after consultation it seemed best to resort to radical surgery and to remove all infected and excess tissue and to produce as near as possible

a normal arch in this patient's mouth. The patient expressed herself as being quite anxious and pleased to have an operation or to have anything done that would help her.

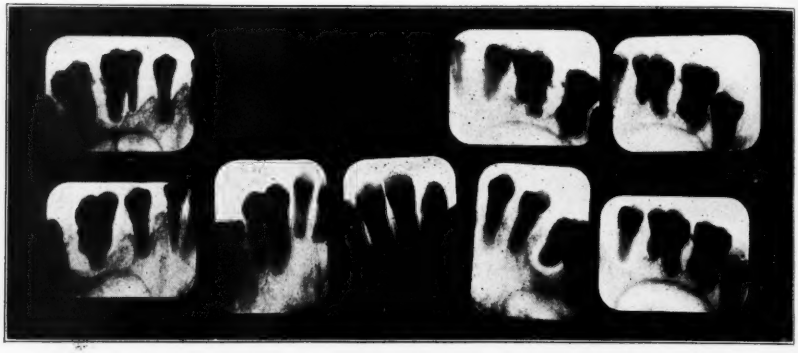

Fig. 6.—Radiograph of upper teeth showing malpositions.

Gas oxygen was considered the anesthetic of choice and the upper jaw was operated first, requiring two hours and forty-five minutes.

After packing the throat and sterilizing the field of operation, an incision was made distal to the last visible molar, carried distally then to the median line on the buccal and labial surfaces. The gum was retracted and with slight chiseling the teeth were lifted out of place, using a forcep. The lingual gum tissue was retracted. A ronguer was used in the removal of the greater part of the process both buccally and lingually. The granuloma, cystic and infected tissue was removed with a finger grasp curette and the rough process smoothed with a multiple cutting instrument used as a file which does not produce friction and is used with a finger grasp. Then the excess gum tissue was cut away and approximated leaving a slight opening for drainage. After the curette was used to smooth over all surfaces and to remove any spicula or rough edges, the gums were approximated and sutured.

Fig. 7.—Radiograph showing profile.

A valuable addition in this operation was a suction machine which was used

by the assistant keeping the field of operation free from blood and small spicula. About an ounce of hypertrophied gum tissue was removed. The patient had an appreciable reaction afterward with a temperature at 102 for three days but this soon subsided.

At a subsequent time the lower jaw was operated in the same manner as the upper. The total operating time of both upper and lower was five hours and thirty-four minutes with all the teeth removed and about two ounces of hypertrophied gum tissue. A pronounced cellulitis developed in the lower jaw after operation but was successfully aborted by external treatment.

These operations produced almost a normal condition in the ridges of the upper and lower jaw, allowing the tongue full freedom of movement and much more space in either arch. Before the operation on the upper, it was impossible to put the thumb up in the palate without coming in contact with the excess gum on either side. And on the lower there was no room for the tongue in its normal place because of the horizontal position of the teeth.

In ten days on the upper and two weeks on the lower, impressions were taken which are shown in Figure 8. The impressions show almost a normal gum outline the same as after all the teeth are taken out of any mouth. Also the second series of pictures were taken of the patient after the teeth were taken out as shown in Figure 9.

An upper and lower set of teeth were made three weeks after the last operation, which are shown in the patient's mouth in the third series of facial pictures (Fig. 10).

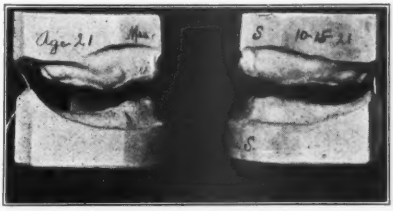

Fig. 8.—Models after operation, right and left lateral view.

The patient has shown a continual improvement in health almost from the time the first teeth were removed. Since the last operation and the upper and lower teeth were put into place she has shown a wonderful change. She had increased in weight and in a very short time after the teeth were in place she weighed over one hundred pounds and felt greatly improved in health.

Fig. 9.—After operation, before restoration.

You will notice by comparison in looking over the three series of facial pic-

tures the variations in the tone of the patient from every point of view. In the first picture notice the suggestion of facial expression, the lack of tone of the face and eyes, the lack of interest in life causing her not to brush her hair or to keep her clothes in as good a condition as is shown later on in the pictures. Also notice the enlargement of the neck which has gradually disappeared. The three series of pictures were taken about four months apart. She now weighs one hundred and eight pounds and feels like a new individual.

Fig. 10.—After restoration.

FLASKING AND PACKING OF VULCANITE WORK IN DENTISTRY

By M. H. DUNHAM, D.D.S., Omaha, Nebraska

(Read before the National Society of Denture Prosthetists, Los Angeles, California, July, 1922)

I WAS prompted to discuss the phase of denture construction which I am now submitting, through the reading of articles by Alfred Gysi recently published in the *Dental Digest*, and also a paper by George Snow.

These very helpful scientific presentations show in a most interesting and conclusive way the phenomena peculiar to rubber during the process of vulcanization. Rubber when subjected to heat expands until a maximum point for that grade of rubber is reached, and it then contracts until a maximum point of contraction is registered. In order that the contraction shall be controlled and the rubber returned to its original contour, pressure must be maintained during both expansion and contraction. A volute spring yields with the expansion and its pressure returns the rubber while contracting to its original form.

If the rubber were not permitted to open the flask slightly during expansion, the teeth of a denture would be pressed into the plaster material or the cast distorted through the compression.

Both investigators mentioned, make allowance for an excess of rubber beyond the actual needs of a case, when they close the flask. I maintain and hope to show beyond the possibility of a doubt that such excess of rubber at the time of closing the flask is unnecessary. This necessitates that only a sufficient amount of rubber be used when the flask is closed, that proper pressure be maintained during vulcanization—both during the period of expansion and the consequent period of contraction.

After the case is articulated, or occluded, and tried in the mouth for final inspection as to correctness of mechanical character and esthetic effect, wax is added until, in the judgment of the operator, the desired facial contour is secured. The case is removed and dried with towel and chip-blower, care being taken to remove moisture from between the teeth. When the denture is to be of vulcanite, the pattern is returned to its original cast, the cast being made of artificial stone, and sealed hermetically along the periphery. Minor additions of wax around the necks of the teeth may be made at this stage; this is to facilitate carving to contour in such manner as may appeal to the operator. If this carving results in exaggerated contours, the wax pattern should now be supplied with tin-foil. I believe that the carving should as closely as possible simulate natural contours, since, among other advantages, natural contours permit an easier cleans-

ing of the denture. Steele's Rugapak, large enough to cover the anterior palatal portion of the base up almost in contact with the anterior teeth, is selected; the under-surface convolutions are filled with base-plate wax, and it is adapted and sealed to the wax pattern.

In flasking, I prefer to use a heavy machined flask accurately constructed so that when the two parts are put together they can assume but one relationship and will maintain this relationship throughout successive operations of opening and closing, preferably the Sears machined flask.

Since this is to be a vulcanite base, the stone cast is trimmed until, if possible, the periphery of the base lies in a horizontal plane with the edge of the lower half of the flask. If it is to be a metal base denture, the stone cast will not be used but the case will be invested so that its periphery lies in the horizontal plane as suggested a moment ago.

I use hard cast plaster as an investing material, and this, after the primary set, but while it is still easily manipulated, is trimmed so that no undercuts will remain. It is given a smooth surface, which is also continuous with and in a plane with the periphery of the pattern and edge of the flask. Loose particles of plaster, which have come into contact with the wax pattern are removed with a brush under running water. Diluted liquid silex or thin soapsuds is then applied in order to facilitate later separation of the two parts of the flask.

The upper portion of the flask is placed in position and filled with plaster, taking care to drive out all air during the process. After the plaster is thoroughly hardened, which may be determined by preserving the excess and testing it, the flask is placed in boiling water for a period of from one to two minutes depending upon the size of the flask. The two parts of the flask may then be separated easily by holding the flask by the upper portion and tapping lightly with a horn mallet until the lower releases itself and eases gently down upon the bench. The wax will be found somewhat softened but it should not have remained in hot water long enough to become fluid; this softened wax is removed and the case thoroughly washed out. For this purpose hot water is used, and it is not wise to use the same water in which the flask is boiled, because this is likely to contain sufficient wax to deposit a thin film of grease. Such a film makes it difficult to pack with rubber, without incorporating some of this greasy deposit. When this method of washing out the wax is followed, the exterior of the flask is also more easily kept clean.

The teeth and interior of the mold are cleaned by the use of chloroform.

Walker's Granular Gum rubber is cut lengthwise in strips of sufficient width to extend from the lowest point of the interstices between the teeth to the highest point on the periphery or to the rim of the base. A strip is carried from a line posterior to the second molar to a corresponding point upon the opposite side. Inasmuch as this periphery is irregular in height, there will be an excess of gum facing at the low points which will need to be cared for. The strip is folded over upon itself, thus making a double thickness at the low points. With considerable pressure, preferably using a blunt instrument, the facing rubber is packed carefully between the teeth, entirely filling these spaces and making sure that none of this strip of rubber surrounds the pins, or, in case of diatoric posteriors fills the retention pits.

A strip of base rubber long enough to extend from tuberosity to tuberosity is packed into the retention grooves and around the pins, special care being taken that the base rubber shall not displace the granular gum pink and thus show when the finished denture is worn. At no time is heat used during the process of packing, except the heat contained within the flask, thus avoiding the use of a prematurely expanded rubber. In a full vulcanite denture a layer of base rubber is then placed over the palatal surface of the mold and by means of pressure connected with the strip of base rubber which has just been packed about the pins. Since there is not a sufficient amount of rubber in the case at this stage a strip of Holland (the linen material in which the sheets of rubber are put on the market) is moistened in hot water, washing sufficiently to eliminate the starch, and placed between the two parts of the flask. The flask is closed, put into a Wilson flask press with volute spring, and placed in boiling water where, as the rubber softens, the flask is gradually closed. Throughout this process, care is exercised to avoid sudden pressure at any stage. When the flask has closed, it is then removed from the press, the two parts separated and the surface of the rubber is washed with hot water to remove any traces of starch that may have been left as a result of contact with the Holland.

When separated, the surface of the rubber will show areas upon which no pressure has been exerted. These areas are now supplied with additional base rubber and any slight excess that may be showing overlapping the periphery, is removed with a sharp wet knife. In full vulcanite, a thin layer of base rubber is now adapted to cover the surface of the granular rubber from the periphery to its juncture with the base rubber previously placed. We now have the entire palatal surface covered with base rubber; the Holland is replaced, the flask closed as tightly as possible and put again into the flask press and boiled until it is entirely closed as before. At no time should there be an excessive amount of rubber in the mold, since under pressure the gum facing will become so very thin that the red base rubber may, through polishing, be exposed, and further, the granular gum under too great pressure may be so distorted as to result in an unnatural appearance of the gum facing, as well as cause a fracture of the mold, displacement of the teeth or cause the vault to warp.

Again the flask is opened and the rubber cleansed as has previously been indicated. If the surface shows that a sufficient amount of rubber has been added during the successive openings and closings of the flask, the flask is ready to be closed preparatory to vulcanizing. The technic that we have followed seeks to avoid an excess of rubber and consequently the operator is willing to open the flask three or four times if necessary in order to add a little more rather than to risk adding too much at any one time.

No. 60 tin-foil is cut to such pattern as will relieve hard areas, and if required two or more thicknesses are used. These should be sealed to the cast by means of sandarac or shellac in order to hold them in place while No. 10 tin-foil is being adapted. A sheet of No. 10 tin-foil is cut to size sufficient to cover all the surface of the cast; it is adapted by means of a shaving brush, a cloth, or cotton-roll, and the wrinkles are removed by burnishing. This tin-foil surface is given a coating of lather made from laundry soap in order that

the tin-foil may be removed easily from the case when vulcanized.

The flask is closed and four Little Giant flask springs are adjusted and put into the vulcanizer where the case is vulcanized after directions supplied by the rubber manufacturer. I bring the heat of the vulcanizer through a period of thirty minutes up to 320 degrees Fahrenheit and hold it at this temperature for one hour. At the end of this period the vulcanizer is removed from the flame, gradually cooled until the flask may be removed and it is allowed to become thoroughly cold when it may be opened and the case removed and cleaned with a stiff brush under running water. All surfaces except the intaglio are smoothed by the use of fine grit sandpaper. Unevennesses are trimmed away from around the necks of the teeth and any scratches are removed with the use of cloth wheels, felt cones and brushes aided by powdered pumice, and a high polish is given with cloth buffer and whiting.

In the case of metal bases it is obvious that the metal base serves instead of a stone cast for vulcanizing purposes. The metal base and the wax pattern are invested as described previously except that the investment is carried over the palatal surface of the metal and extended to junction line of wax and metal base. The upper part of the flask is then filled and the case packed as in the case of vulcanite with the exception of course that no rubber is required over the palatal portion. Care to avoid excess of rubber is exercised as in the case of vulcanite bases. When the base is of aluminum a thin layer of S. S. White's weighted rubber is adapted to the attachments of the base. I have found this necessary in order to keep the vulcanite from leaving its moorings. The flask is then closed as already outlined and the vulcanizing and finishing is carried forward. When the metal base denture has been polished, the intaglio of the aluminum is etched with concentrated hydrofluoric acid applied with a small cotton swab, after which the acid is neutralized with a solution of sodium bicarbonate.

THE RESPONSIBILITY OF THE DENTIST

BY VIRGIL LOEB, A.B., M.D., D.D.S., St. Louis, Missouri

(Read before the Alfred Benjamin Dispensary, Kansas City, Missouri, December 7, 1922)

A PROFESSIONAL man assumes great responsibilities when he makes the choice of his life's work. Whether he be in medicine, dentistry, law or engineering, his duties are more exacting and his obligations greater than those of the average layman. Why? Because the public considers him an expert and gives him unqualified confidence. A man who spends years in directed study has opinions that are of value to the community and his advice is worth seeking. On the other hand, to merit this high confidence of the public is his first responsibility.

Because of the human element attached to medicine, of which dentistry is a branch, the men who become practitioners of this art have perhaps a closer affiliation with the public than those who enter into any other field. The work of the physician and dentist is one which causes their patients to reveal their innermost feelings, and because of this intimate contact they feel such an implicit trust that it may safely be called one of the most sacred of human relationships.

In reviewing the responsibilities of the dentist, we must keep in mind the great strides which dentistry has made during the past two decades. In the early days the training of a dentist was so limited that it only required a year or two of study and practice. Little or nothing was known of the importance of the teeth to the general economy and of the close relationship existing between oral diseases and certain systemic conditions. Advancement has been rapid and now it has been proved necessary to equip the dentist more thoroughly in order that he may deal with conditions of the oral cavity in a more intelligent way. As a result, the standard of admission to dental colleges has been raised, and the courses in the colleges lengthened and improved. Hand in hand with this advancement in training have come the increase in responsibilities. Where formerly a dentist had completed his work when he had relieved pain in the mouth and restored missing teeth, he must now in addition make a study of each patient similar to that which the physician should undertake.

For convenience I will group the responsibilities of the dentist under four headings as follows: First, to the patient; second, to his profession; third, to the public; and fourth, to himself.

The greatest responsibility which the dentist has is his patient. When he presents himself for advice and treatment, the dentist immediately assumes the responsibility of the entire oral cavity. Though the patient may be complaining of pain in one small area, for example, it is incumbent upon the dentist to examine the entire oral cavity and give

advice regarding the same. Let me say without further discussion that the day is past when the dentist's duty is completed when he examines the teeth and their immediate surrounding structures. Irrespective of the complaint of the patient and of the symptoms presented, it is necessary for the dentist to make a careful and complete examination of the entire oral cavity in every case. The importance of this cannot be overestimated nor can this statement be too frequently repeated. It is astounding how many men are satisfied with a casual examination, and much that is overlooked may cause distress to the patient.

The time has long since gone by when dentistry was purely a mechanical profession, and when the restoration of lost dental organs was the prime consideration. Now we know that it is just as important for the dentist to make a complete examination of the oral cavity as it is for the physician to make a complete physical examination in every case. While patients may consult the dentist for a specific condition, something abnormal may be presented which is wholly unsuspected. There are many diseases peculiar to the mouth, and there are many local oral manifestations of more remote or general diseases which may be presented without giving any sign to the patient. We know that many such conditions may eventually result in chronic infirmities and even death. How can the dentist justify himself if he overlooks anything which may prevent such conditions? It has often been said that medical men are responsible for the death of many more patients than dentists. While this remark may literally be true, the impression given by it that dentists are responsible for the death of very few is not entirely correct.

Opinion is divided as to the importance of the relationship between focal infection of dental origin and certain systemic conditions. However, it cannot be denied that in a great many cases this relationship is certainly one of cause and effect. Where distinct evidence of infection about the teeth, of long duration, is accompanied by symptoms of disease in other parts of the body, we must suspect it as a causal factor. Cases of acute and chronic joint inflammations, heart, eye, and other affections may be due to the absorption of toxins originating in such areas. With this knowledge, it is the duty of the dentist to use his best efforts to prevent the formation of such an area about the teeth, and to eradicate it when found. Knowing the distress which may come to patients from the development of such pathological conditions which may be within or beyond his control, it is necessary that he use more than ordinary care. His responsibility does not cease with the discharge of a patient after the completion of certain work, but rests with the outcome of such work, as well.

We have just recently passed through what is known as "Cancer Week" throughout this country. In every city and town of any importance lectures, literature and other propaganda have been calculated to impress upon the public the importance of the early recognition of cancer and the necessity of such recognition if a cure is to be effected.

From fifteen to eighteen per cent of all cancers affect the tongue, jaws and lips. It has been claimed by Bloodgood that from fifty to sixty per cent of these could actually be avoided. It is true that we do not know the direct cause of cancer, but we do know that chronic irritation, of whatever type, is responsible for the activity of cancer producing cells. Irritation in the mouth results from many causes, such as improper dental work,

broken teeth, tobacco, etc. On account of these, we must constantly be on the lookout for points of irritation, and must warn our patients and correct the condition immediately wherever it is found. Unless a careful and complete examination in every case is made, many such points are overlooked. Irritating crowns and bridges, broken roots of teeth, etc., are sometimes allowed to remain in the mouth for one reason or another when they should be corrected. Likewise leucoplakia, which is so common in the mouth, and which we know in certain stages may become cancerous, is so frequently passed over without comment, either from lack of knowledge or lack of observation.

When we weigh all of these facts on the one hand, and the very short time necessary to make a complete oral examination on the other, we must admit that it is a sad reflection on the dentist when he overlooks any abnormality in the oral cavity. It only requires a few minutes to press back the folds of mucous membrane with the mouth mirror, look at the tongue on all surfaces and examine the palate and mucous membrane of the mouth, cheeks and lips. This followed by palpation with the index finger may complete the examination. The palpation is of the greatest importance since the earliest sign of malignancy is an infiltration of tissues about the affected area. The examining finger after awhile becomes so trained that one can immediately detect such areas.

It is true the dentist may not be in a position to cure all that he finds, but he can either cure or direct the patient to the proper source for treatment. Let the work of the dentist be not limited to preventive dentistry, as such, alone, but let it be enlarged to embrace prevention of all diseases to which the oral cavity is heir.

After an examination has been made, one must not trust his mind to retain all the information which he has found, but should record his findings on proper history sheets. This is of immediate value, and is indispensable years after when the patient returns for further examination or advice.

It is needless for me to go into the discussion of the co-operation which should exist between members of the profession, but I would like to dwell for a few moments upon the lack of co-operation which often does exist. This seems to me to crop out frequently when some men who are particularly efficient in certain lines hesitate or fail to give freely what they have found to other members of the profession. I realize that this is not true in many cases. I know the large majority of dentists are ever willing to give their time and effort in raising the standard of their profession by helping other members. They give clinics, they give lectures, and they write articles, all of which have a common aim, namely to elevate the standard of dentistry. The men to whom I refer are those who give courses and insist upon charging large fees for disseminating their own knowledge. I have no sympathy for the man who sells exclusive information which is necessary to relieve human suffering. If one has by his effort made a discovery or determined a new process which will aid in accomplishing the relief of human ills, what greater glory could he desire than to give this to others so that they may assist in the work? Because certain men sell their information does not, of course, mean that what they have to offer is necessarily worth buying. It may or it may not be. It is the principle to which I object. The more commercialism is allowed to enter into our work, the more the standard of our profession will be lowered.

Let us give freely of what we have for we owe this to our profession. We owe it not only to our profession but we owe it to the patients of our professional brothers. I may appear harsh in making the following statement, and yet it is too true. I have usually found where I have attended lectures at Society meetings by men who were paid, that they usually had something to sell. I realize that one loses time from his work when he visits other cities, and he is entitled to his actual expenses in traveling, but to be paid in addition is not the proper policy. The giving of time is one of the sacrifices which professional men must make. It may be said in answer that it would be impossible for men in smaller communities to keep abreast of the times if they were not able to obtain courses from men proficient in certain lines of work and that these men cannot spend the time to give such courses unless they are properly reimbursed. In answer to this, I would say that there are many post-graduate courses given in dental colleges where teaching is a business and where information can be properly obtained. In addition to this, I may cite an institution which has been in operation in my own city for the past five years with the greatest success, "The St. Louis Study Club of Dentistry." For five years there has been a corps of teachers, who, throughout the winter on two or more evenings of each month, have cheerfully given their time to instruct any ethical dentist who wishes to take an intensive course of study in any of the various branches of dentistry. These courses are given with the greatest amount of detail and are absolutely free. It is this spirit of co-operation which I would advise to bring about a closer affiliation between members of the profession and to further the study of advanced methods of treatment.

Toward the public one of the chief responsibilities of the dentist is education for ignorance and carelessness are the basis of most of the diseases common to the mouth, particularly caries. It is a common fault that the dentist is not consulted until abnormal conditions are developed, and pain and discomfort force one to seek help. In this way caries flourishes in mouths to a degree well known to all of us. We, as professional men, realize that the more care and attention given to the teeth, the less amount of caries develops. A certain amount of information relative to this proper care and attention is passed on daily to people in the routine of practice, but the masses who need this information most, the great majority of whom perhaps never consult a dentist except when suffering from pain, cannot receive it unless there is some organized propaganda. It should be the duty of dentists, wherever possible, to acquaint the public with the necessity for oral hygiene, and with the methods by which this is best maintained. If the majority of the people understood the necessity for keeping the oral cavity in proper condition and the benefits to their oral and general health by so doing, a great deal of the harm which is now resulting from the lack of care could be obviated. We should never lose the opportunity to give this information freely in whatever way we can so long as it is done ethically. Talks before various clubs and social organizations, charitable institutions, school children, and any collection of persons interested in the uplift of humanity, are of inestimable value. If we can do no more than to teach parents that it is incumbent upon them to see that the teeth of their children are properly looked after, the coming generations will be spared much of the annoyance and many of the diseases which are now so prevalent.

Institutional work should be encour-

aged. Where employes of large corporations can have access to a dentist or dentists employed for that purpose, the employes soon seek the attention which otherwise they might neglect. Already many of the large business concerns of this country have regularly employed dentists, and the benefits resulting from their practice are reflected in the improvement in the character of work performed by those getting the proper attention.

Wherever it is possible to establish public clinics, this should be done. It is incumbent upon every dentist to do a certain amount of charitable work. I do not refer to the cases which he will see in his office from time to time and for which he makes no charge. I feel that he, as the physician, should give whatever time he can to public service in a clinic of some kind. There are so many people who need attention and who cannot afford to pay for it, and comparatively so few places where such attention can be received, that more of us should lend a hand for the great amount of good that can be accomplished. We cannot too strongly commend and give public credit to the benefactors who in several of our cities have established large institutions for charitable work. Let us hope that the time is not far distant when every city and every town in this country will be similarly equipped. It does not necessarily take a magnificent building, though this is to be desired if possible, but what is essential is an inclination and earnestness on the part of the men to do this work. If we possess these qualifications, the rest will come easy. Of course, to get the best results it is necessary to have paid full time or half time men in such clinics. There is still much which the dentist who cannot give but a limited time can do in assisting in the work. There is, I dare say, no School Board which will not co-operate with the dentists toward establishing clinics in the schools. In St. Louis, of which I can speak from personal knowledge, during the past few years clinics have been established in several of the schools, and the number of such clinics will be increased as funds are available. It is needless for me to tell you what good already has come from this work. I understand that work of this kind has been done in this, (The Alfred Benjamin Dispensary), for a number of years, and the gentlemen who are responsible for this are to be highly commended. I trust that they can see fit to enlarge their activities and that every public dispensary may copy their efforts.

Another duty which the dentist owes the public is protection from quacks, charlatans and their wares. The public, as we know, is gullible and easily swayed and often the convincing arguments of the advertiser and his like are received by the unsuspecting, and the usual results follow. No one who has the proper skill needs to advertise. His own efforts constitute his best advertisement. The fake cures which are on the market at the present time do more perhaps to retard the progress of dentistry than any other thing. People naturally accept the easiest way, and without being cautioned will at least undertake to be relieved by preparations whose manufacturers boast of their effectiveness in order to pad their pocketbooks.

I cannot too strongly impress upon you the necessity of the protection of the public from agents such as I have just mentioned. I question whether many of us realize the amount of harm done by the quack and the faker. The advertised speed of their cures and their cheapness appeal to their victims and lure the innocent patients, who usually find in the

end that cheapness is sometimes extravagance and that speed is not a timesaver. If the money spent for fake cures which are on the market, and I mean those dispensed over the counter as well as those frequently bought at the chair, could be used to endow dental clinics, a most valuable work could be done.

To himself the dentist owes that which keeps him alert mentally, and well physically. To give the best to his patients, he must seek knowledge from others. This he obtains by reading the best dental journals, studying the new books written by the better men, and by attending scientific meetings. No one should be entirely self-satisfied. He is always in a position to learn. Although he may not learn to do something, he may learn not to do something, which is equally important. Entering into the discussion of scientific papers brings out different viewpoints from which he and others may profit. Where it is possible he should indulge in research work. It has been truthfully said that research workers are born and not made. It is sometimes quite difficult for one, however interested he may be, to carry out research problems, but where he has the inclination to do so, he should try. There are many problems in dentistry yet to be solved, and each one of us who makes an effort toward their solution will be doing that much more for humanity. How often have we heard that "all work and no play makes Jack a dull boy." The dentist must reserve some time for recreation. To enable him to give the best that he has in him, he must keep his vital powers up to a high degree of perfection. He should reserve a certain part of each day, or at least of each week, for exercise and sports which he enjoys. Though one may not realize it, he becomes dull by the constant and continuous application of his art without proper relaxation.

Thoughts such as I have discussed are in the minds of all of you perhaps, but it is only by constantly reminding one of his duties that the best that is in him is brought out. I hope that I may have stimulated those who are aware of their responsibilities to continue in their desire to do all that they can, and that I may have awakened in those who have not realized their duties, the desire to follow in the footsteps of those who have.

OPERATIVE PROCEDURES ON CHILDREN'S TEETH

By PAUL A. BARKER, D.D.S., Denver, Colorado

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

PREVENTION is becoming more and more the dominant idea in dentistry and one needs only to glance over the program to find that the American Dental Association has become its sponsor and realizes that ten years must be added to human life during childhood. Some may ask, in what way is prevention connected with childhood. Webster defines it as "a hindering by previous action, an act of caution." If this is correct, then surely preventive dentistry is such in name only where it does not include dentistry for children for at what other period during human life can so many destructive diseases be hindered or prevented; when is there a time that the body responds so quickly and easily to a little preventive practice as it does in childhood?

Only in this period of life can developmental defects be successfully dealt with and during this time occurs the greatest incidence of those diseases and infectious conditions which so largely determine the disabilities and deformities of later life. In this field the medical profession is far ahead of us for many of the problems of preventive medicine in childhood are well formulated and diligently practiced. Tuberculosis, for example, as now generally recognized is essentially, at least in its inception, a disease of early life; measles, scarlet fever, diphtheria, poliomyelitis rickets and adenoid and tonsil infections to which may be ascribed so many of the cardiovascular, renal, articular nervous and other disorders of later life, all occur chiefly in childhood and methods of control, if they are to avail anything must be applied then.

Surely it would seem reasonable then to suppose that the dental profession would also long ago have recognized the fact that nearly all tooth decay begins in childhood, that half of the malocclusions could be prevented if taken in the younger years and that much of the dread disease of pyorrhea is directly attributable to neglect of mouth hygiene during the formative period. Such, however, is not the case for instead we have continued along the old beaten path of restorative dentistry, becoming highly skilled mechanics and learning to repair that which has been damaged and to restore that which has been lost but carefully neglecting those principles of practice which would forestall these losses and prevent this damage and its consequent pain. Dentistry, as it is practiced today, reminds me of a fable I once heard of a man who tried to empty the ocean with a teacup, the faster he dipped the water out the faster it ran in. So it is with dentistry, the more restorative work we do the more there is to be done.

Why not start our work at the beginning and add those extra ten years to human life where they may be added the easiest.

Otto U. King has said: "The true aim of dentistry is to eliminate itself. The true physician and dentist are not engaged in doctoring—their business is to get to the fundamental causes of disease and then educate the public to adopt preventive measures. When the program of reparative measures is replaced by one of prevention, the ax will be laid at the foot of the tree."

So indifferent have the majority of our profession become to this branch of their work, that one of the presidents of the American Medical Association recently chose as the subject of his paper given before that body, "The Care of Children's Teeth, the Most Neglected Feature of Pediatric Medicine," and in that paper he says: "The problem of the care of children teeth remains very generally neglected and many members of the dental profession indeed seem woefully ignorant of the importance of the conservation of children's teeth; and so commonly do dentists refuse to accept children as patients that there is often great difficulty in having the work done." He says further: "It has been my frequent experience in trying to save the deciduous molars or even the first permanent molar to have dentists refuse to undertake the work on the ground that it was not worth while." This is indeed a scathing denunciation of our profession and the saddest part of it all is that it is only too true, "the shoe fits and we must put it on."

It is a blot on the fair name of our profession that any member of it should argue that dentistry for children is not worth while. It is an actual fact that the number of cases of starvation among the children of New York City has more than trebled in the last decade while with the exception of defective teeth, disease has declined but there has been a tremendous increase in malnutrition and the basic cause of malnutrition is bad teeth. In almost any dental journal one may read the reports of school dental clinics from every corner of the country showing facts and figures of the tremendous retardation of school children which is directly caused by oral sepsis. If any sane dentist will only honestly consult his own knowledge of the cause and effect of focal infection upon his adult patients and will then remember that the child he is asked to treat is many times more susceptible to this cause and effect, he will never again be able to compromise with his conscience and advise the anxious mother that "those baby teeth will soon fall out and do not need filling."

And now let us analyze if possible the reasons why our profession has so sadly neglected the children in the past. Apparently there are only two main reasons given, the first being the ingrained fear and dislike which many men seem to have for working on a child, and the second the fact that operations on children have always been a waste of valuable time to the general practitioner when considered from a financial standpoint. In some men this first reason of ingrained fear and dislike for children amounts almost to an obsession for many of them have told me that they would rather take a beating than work on a child. This type of dentist should never attempt to work on children for it is an actual fact that they often do more harm than good by arousing in the child's mind an unwarranted fear of a dentist which subconsciously remains with him throughout his life and causes him to endure excruciating pain and possibly the loss of all his teeth rather than consult a dentist. There is another type of man who

will avoid operations on children's teeth because he dislikes to cause them any pain. To this man I would say, perform all the work on children possible for you have the natural sympathy for pain which is one of the first things which the child unconsciously seeks in the operator working on him, and in the greater association with children you will overcome that fear of causing pain in the knowledge that this little pain of present operation will eventually prevent a greater suffering to the little one.

The answer to the second reason for dental neglect of children is that the profession themselves are to blame for the fact that the laity do not want to pay a proper fee for work on their children's teeth and the reason they do not want to pay this fee might be answered in three words, lack of education. How many of you have spent ten or fifteen minutes with the fond mother who has consulted you regarding her boy's teeth, pointing out to her the fact that those deciduous teeth should be cared for, those cavities filled while they are yet small, those abscessed teeth either treated or extracted in order to prevent his very health becoming impaired. How many of you have taken time to show her the terrible results of too early loss of the deciduous teeth with its resulting malocclusion, face deformity, nose, throat and even eye trouble. It is my firm belief that if the profession would spend a little more time in education that they would find but very few parents who would be not only willing but glad to pay them a reasonable fee for their services to the children.

The life of a child from a dental standpoint might be divided into three important and distinct ages which I would call babyhood, pre-school age and school age and it is going to be one of the very important requirements of the up-to-date dentist of the future to know just how to handle each age properly. The age of babyhood I would give as from birth to two years. The pre-school age from two to five and the school age from five on up through later childhood to ten or twelve years. The age of babyhood is of course considerably limited as far as actual operations on the teeth are concerned and such operative procedures as are necessary might be grouped under the two heads of prophylaxis and emergency work as they nearly all consist of either the removal of stain from the teeth or the extraction or treatment of a deciduous tooth for relief of pain. Under the latter head would also come the lancing of the gums to permit the eruption of the deciduous teeth and this is an operation which the dentist and not the physician should be called upon to perform for too often the physician is comparatively ignorant of the exact location, size and shape of the erupting tooth and will use the lance too freely causing excessive hemorrhage and fright to the child and many times getting an infection under the fresh gum flap causing considerable swelling and pain, and in the majority of cases these freshly lanced gums will heal together immediately forming a thickened, tougher gum tissue which is even more difficult for the new tooth to pierce. In these cases there is nothing that will compare in effectiveness to the actual cautery where it can be used. It opens the desired space with even less pain than does the lance, the edges of the opening are bloodless and sterile and you know that one operation is enough for they will not heal together and again imprison the erupting tooth. In using the cautery on a child great care should be observed in the matter of holding cheek and tongue away with cotton rolls and a type of cautery should be used which may be turned on after it is in

the mouth thus eliminating the fear which will grip him if he sees it heat up.

Without doubt the greatest field for preventive work during the age of babyhood and even before birth is the field of nutrition and dietary control. The work of Howe, McCollum, Mellanby and others in their experiments on animals which has proven that control of tooth formation is possible by dietary control should certainly indicate that in the very near future the same results might be obtained on the human race, and that the day is not far distant when we will battle the enemy of decay and deterioration in children's teeth not only from without with engine and chisels but also from within by means of a dietary control of mother and child.

The pre-school age is the one which offers the greatest field for preventive operative procedures and it is this age which has probably been most avoided by the dentist for these little patients are more difficult to handle than any others, standing as they do between the age of babyhood, when you can and generally must perform your work more or less forcibly, and the school age when the child is old enough to be reasoned with. These children have not yet come under the influence of the school dental clinics and oral hygiene lectures and yet they are getting old enough so that the mother neglects the daily mouth cleansing which was deemed so necessary while the baby was cutting his teeth and as a result you will generally find the mouth of your pre-school child badly in need of prophylaxis or reparative work. J. H. Clark of Cleveland in a recent report of work done at the Hospital Dental Clinic for pre-school children states that out of four hundred seventeen children operated in 1921, ninety-one per cent had dental caries, seventy-one per cent had more than five cavities, thirty-four per cent more than ten cavities and the average was eight plus cavities to the mouth. Fifty-nine and eight-tenths per cent of these children had abscessed teeth ranging in number from one to ten per mouth and fourteen and nine-tenths per cent needed orthodontic treatment and the average age was four years. The school age is the one which has had the greatest amount of attention, due to our school clinics and inspections and it is during this age that the greatest amount of reparative work must be done and these children probably concern the general practitioner more than any other for they present in general practice nearly every day.

In placing fillings in these deciduous teeth we are many times faced with a difficult proposition for it has been my experience that by the time these mouths are presented to the dentist they are in a pitiful condition indeed and tax to the utmost our patience and ingenuity in their repair. In this type of work we are presented with these problems: First, we must use a cavity preparation which will give us the maximum of strength and retention with the very minimum of cutting. Second, we cannot in the great majority of these teeth remove all decay for in so doing we would have pulp exposure which is to be avoided above all things. Third, the idea of leaving that decay in the cavity unsterilized is not to be considered; we must therefore resort to one or both of two expedients, either that dentin must be thoroughly sterilized by some agent before placing the filling or else we must use some type of filling which is in itself inhibitory to the spread of decay or both may be used. Fourth, we must use some type of filling material which has as much adhesive quality as possible and which will stay in place with the least amount of retention. Fifth, it is also desirable that our filling shall

hold its contour and shape under stress of mastication so that our contacts are not destroyed, but of these last two qualities I believe that of adhesiveness is the most necessary to the general practitioner. Sixth, we must so conduct our work that the maximum may be accomplished in a short space of time, (for children should not be given sittings of more than thirty minutes) and so that the very minimum of pain and fright shall be given. Seventh, and last but must important, frequent inspection of the work is imperative for good results.

For convenience we will consider these problems separately. First, the cavity preparation will be controlled by two things, the amount of solid tooth structure remaining and the type of filling to be used. If a metal filling material is used it is vitally necessary to obtain a good dovetail preparation and gingival seat, otherwise your filling will loosen in a few days and become crowded down into the interproximal space, and this automatically eliminates amalgam from about sixty per cent of proximal cavities as there is rarely enough solid tooth left to meet this requirement. If a good cement is used less retention is necessary and many times it may be used on a flat surface with no retention at all. We prepare our cavity by removing with a bur all soft decay possible without endangering the pulp, breaking away and smoothing up the thin enamel walls with chisels and then undercutting very slightly if possible with a small wheel or inverted cone bur on buccal, lingual, occlusal and gingival. Problems number two and three we now have in the bottom of our cavity decayed dentin which must be sterilized and after observing results in some eight hundred cases extending over a period of three years in the dental clinic of Denver public schools, I do not hesitate to say that the ammonical silver nitrate treatment as developed by Percy Howe and used extensively at Forsyth Infirmary is far superior to anything of the kind which has ever been given to the dental profession. This solution penetrates all decayed dentin and seals the minute tubules with precipitated silver. Laboratory tests have proven that it absolutely sterilizes and hardens this decayed dentin and gives you a firm, sterile base on which to build your filling; and most desirable of all, it leaves the natural roof over the pulp which is far superior to any pulp capping ever devised.

Problem number four regarding filling materials is a problem indeed and there is room for great improvement. It is very advisable to use one which has enough copper content to inhibit decay and this means that it must be either copper amalgam or copper cement and it is my belief that the cement will be most effective in the hands of the general practitioner for it is easy to manipulate, sets immediately, requires very little retention or cutting and above all it stays "put." The one and only objection to it is that it will wash out, but this objection may be eliminated by frequent inspection of your work and refilling at the proper time. It would be a godsend indeed if we could obtain a material with the adhesiveness and inhibitory action and nonconductivity of copper cement combined with the wear resisting qualities of amalgam.

In answering problem number six I would say that the maximum of work must be accomplished in the minimum of time for after the first fifteen minutes in the chair a child becomes nervous, fidgety and hard to work upon, therefore we must waste no time after he is placed; everything should be ready and accessible, every move should count and yet the appearance of haste must be avoided.

If you know that a part of the operation will cause him pain it should be left until all other work is done if possible. This especially applies to extractions, otherwise the work is rendered much more difficult by the child's fear that you will "pull another one."

The last and most important requirement is frequent inspection of our work, for no matter how careful we have been in the placing of these fillings they will fail much easier than those in the permanent teeth. No matter how painstaking we are in the matter of sterilizing or pulp capping, we must remember that these deciduous pulps die much easier than do the permanent ones and the only thing which will prevent further damage and pain is frequent inspection and early repair. This should be carefully explained to the parent at the time of operation.

Truly this is a rather staggering list of requirements, and one which is not always possible to live up to for nearly all children's work is governed by the actions of the individual child, but it should certainly be worth the effort if we can thereby assure the children of the coming generation a normal face contour, a perfect masticating apparatus, good health and above all relief from pain for has not the Great Teacher Himself advised us that "it were better for us if a millstone were hanged about our neck and we be cast into the sea than that we should cause even one of these little ones to suffer."

In summarizing I would say:

1. That human life may be lengthened by preventive dentistry in childhood.

2. That the majority of the dental profession are today practicing only restorative dentistry.

3. That the aim of the true dentist should be to eliminate himself.

4. That the two reasons for child dental neglect are a fear and dislike for children's work and a small financial recompense.

5. That the first reason may be largely eliminated by education of the dentist and the second by education of the parents.

6. That the child has three dental ages, babyhood, pre-school age and school age.

7. That the main problems presented in filling deciduous teeth are: Type of cavity preparation needed, the impossibility of always removing all decay, type of filling to be used—either adhesive or non-adhesive, wear-resisting or non-wear-resisting, that the maximum of work must be accomplished in the minimum of time. Most important of all is frequent inspection of work.

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Discussion

Haidee Weeks Guthrie, New Orleans, Louisiana: After contagious diseases we must take care of the child whether it be in an institution or in private practice. Quite often a child who has had a perfect mouth will develop, after whooping cough, measles, croup, scarlet fever, from ten to twenty tiny cavities in his teeth. We can account for that condition in two ways, first lack of prophylaxis during the child's illness, and secondly, on account of the rise in temperature which promotes the incubation of the microorganisms in the mouth at that time.

Many times in the seventh or eighth year we see an acute gingivitis which if not checked will develop into chronic gingivitis and then pyorrhea. If we do not take care of these cases when we see them first what can we expect at the thirtieth year when the disease is chronic?

I have several times made the statement that under proper schooling in oral hygiene between the ages of two and eight years, if

the mouth is kept in order to the age of eight, the battle is won and very little dental work is needed after this time. My work has amply confirmed this statement. I am now caring for a community of fifteen hundred children without assistance, except for lay helpers. I am able to do this because the social service workers give me the most perfect co-operation.

We have a day nursery where we average one hundred fifty children from the cradle to eight years. For two years I selected and observed fifty of these children between the ages of two and four years and we did not have caries in a single case where we used proper diet and a systematic toothbrush drill.

Dr. Barker spoke about the average dentist. That surely is true. If there is a root in the child's mouth the average dentist is going to take that root out if he thinks it is not going to make the child scream; but if the child is going to scream, he will allow it to remain. He will say "it is only a baby tooth; it doesn't make an difference." We must instruct the mothers that these baby teeth are the scaffolding over which the permanent are to form. We cannot have a perfect denture if we are not going to preserve these deciduous teeth. However, if the tooth cannot be filled it must be extracted.

It is in the study of psychology of the child that we are going to gain our greatest point in the control of the child and the management of the child's mouth.

In the child welfare clinics we are trying to do preventive work. We see many pregnant mothers. These mothers many times during the period of pregnancy will come in with pyorrhea. About seventy-five per cent never have had a toothbrush. It is in this work with pyorrhea in these pregnant mothers that our trained nurses help us. They go every day to the homes to see that the mother has used the toothbrush. With co-operation of the obstetrician we see that the mothers are given the proper diet.

I agree with Dr. Barker in his filling materials and his preparation of cavities. I think that it is a question of technic as to what we can do. Some of us can operate with copper amalgam. Some of us can operate with copper cement, silver amalgam or whatnot. I cannot see and I want to have it proven to me whether copper cement is better than other cements or guttapercha. In my hands the easiest thing is a base plate guttapercha. We have used the base plate guttapercha fillings for six years successfully.

Minnie M. S. Proctor, Los Angeles, California: I like some black things. I like copper amalgam. I know that fillings that Dr. Guthrie puts in are as good as the cement fillings that Dr. Barker would put in, but I should dislike to see a general practitioner advised to use cement. I do not see how tooth contour is restored with it. If we are going to advise the use of cements and guttapercha I fear we are going to have many fillings carelessly inserted. There is objection to it in that it washes out. Copper amalgam is often chewed out while soft, not washed out.

Copper amalgam washes out to some extent, especially when a wide contact has not been made. It does not wash out readily and I do not hesitate to use it. You specialists may put in anything you choose and I am sure it would be all right, but do not give it to the general practitioner. Copper amalgam is harder to work with but good results can be obtained with it.

M. Evangeline Jordon, Los Angeles, California: While we are on the questions of fillings I would like to say just a word. In going over or removing some of the work of average dentists I have noticed their curious opinions of the use of nitrate of silver. There was a fad out here for a while of using clay that had nitrate of silver mixed with it, and not removing the caries before putting it into the cavities. Those dentists need a thorough course that they may understand how to use nitrate of silver.

Another thing that the average dentist seems to misuse, is guttapercha in any of its forms. I myself have never been able to place a really satisfactory base plate guttapercha filling. Perhaps as most of my children eat hard foods they chew them out. In my early days, when I was in general practice, I saw a few cases of guttapercha fillings at the cervical margin in older people that had swelled, because of absorption of microbes and fluids of the mouth. I remember particularly one woman who came to me with only a small cervical filling, saying that the tooth had to be extracted, that she had suffered so intensly she could not continue to keep that tooth in her mouth. The filling was only pressing against the gum due to this change of form of the guttapercha. When it was taken out and the tooth properly prepared there was no further irritation.

In regard to fillings in deciduous teeth, I get very satisfactory results from copper amalgam. They now have one that hardens as soon as it is put in, which does away with the knocking out of fillings. But it has this objection, it increases the cost of putting in fillings. You always have to consider your overhead when you are working for children—the more you cut it down the more successful you will be. The old copper amalgam will remain soft, in most cases, during a day's

operations, while the new hardens at once. This necessitates the heating and trituration of each filling.

J. W. Leggett, San Francisco, California: I think we have had too much criticism in this paper of the general practitioner. However, I do not mean to criticize the essayist. I notice that the spirit of this meeting is a great enthusiasm for preventive dentistry, by which is meant diet, study of calcium metabolism, and perhaps prophylactic work in children's mouths; and a slight disregard for operative dentistry. Let me say that until the mouth is edentulous, any dentistry is preventive. Why do we fill a tooth? We fill the cavity to prevent further decay in that tooth. Why do we do prophylactic work in children, or in adults? To prevent the cavity forming. Why do we go still further back and take into consideration the diet? So that there will not be so much prophylaxis necessary. Why do we go still farther back than that and take into consideration the diet of the pregnant mother? In order that we may not have to do so much in the case of a child's diet. So I say that all dentistry is preventive until the mouth is rendered edentulous. I think perhaps that we are a little bit inclined to be alarmed on the subject of the general profession. Those movements such as the establishment of clinics, the welfare work, the licensed dental hygienists have all had the whole-hearted support of the entire profession. I think we should be proud of it rather than to criticize the profession as a whole.

Dr. Barker, (Closing): Dr. Guthrie spoke of the fact that she did not like black things. I do not like them either. As a result I never use black copper cement. I use red copper cement. I believe it does not have so large a copper content as the black cement, Ames' black cement having the highest copper content known. Fleck's red copper cement is one of the finest things we have ever used in our clinic in Denver, and we have tried everything that has been put on the market. I do not believe that the base plate guttapercha should be used in the general practitioner's office for filling children's teeth. That may be a broad statement, but the discussions and papers in any of these clinics are only a presentation of our individual views and experiences that we can grow and obtain the new ideas which we can apply in our own practice. I believe that the people who are doing children's work exclusively, should endeavor to find the best materials, and then present them, wherever possible, to the men who are seeking knowledge on the work of children.

I have no criticism of the general practitioner. I was a general practitioner myself for a good many years. But the fact remains that every person who has done children's work, especially those who have done clinic or school work have a chance to observe the work of the general practitioner on children and many times it is not very good. You cannot be in a hurry with children. You must take your time with these things to do them right. I am not criticizing copper amalgam. I use copper amalgam myself in many cavities especially in occlusals and those proximal cavities where large tooth structure remains and good dove-tail retention can be obtained. These are ideal cases. I intended to deal particularly in my paper with those cases which you have all seen in your office every day for instance one having a first temporary molar with large distal occlusal cavity, an almost hopeless case. You do not want to extract this tooth. You know it should remain there four or five years. There is not enough tooth structure left to give you proper retention. The only answer so far as we have been able to find in our clinical work is red copper cement. That answers the doctor's objection to black things. It gives you your adhesive qualities, so they can be placed with the least amount of retention. The only way I can eliminate the objection of it washing out is by frequent inspection and rebuilding your occlusal contacts if necessary.

One doctor said that all operative dentistry is preventive. I do not agree with him. I certainly believe that the replacement of a tooth lost by extraction is restorative dentistry.

THE RELATION EXISTING BETWEEN THE DENTIST AND THE DENTAL ASSISTANT

By WILLIAM DWIGHT TRACY, D.D.S., New York, New York

(Read before the Educational and Efficiency Society for Dental Assistants, New York, New York, December 12, 1922)

THE majority of dentists are practicing primarily to earn a livelihood; but it is to be hoped that they get something more than that out of it! In fact, the man who does not is not the truly successful practitioner.

So also, it is believed that most dental assistants take their positions originally in order to become self-supporting and possibly to help and sustain others.

The proper attitude of the dental assistant toward her work is the primary requisite for a successful development. Even though a girl may not be gifted in those qualities that seem to be essential, she still may make herself invaluable by devotion to her duties and loyalty to her employer's interests.

I need not touch perhaps, upon neatness and appropriateness of dress, for any young woman seeking employment in a professional office would understand that extremes of any sort in this connection would be inappropriate.

Among the most important attributes I would mention courtesy, tactfulness, patience, calmness, equanimity and cheerfulness.

Courtesy is based, as I understand it, upon a well bred kindliness and consideration for people with whom we come in contact. It is not always easy to be courteous to impatient, irascible and unreasonable people, but fortunately we have but few of this type to deal with and we quickly make a mental estimate of such individuals and realize that these disagreeable qualities may be traced to poor breeding, weakness of character or ill health, it should enable us still to be courteous, and sympathetic and to smooth over a situation which if met in the same petty spirit as shown by the patient, might become acute, much to our regret.

Tact may be spoken of as that personal quality which enables the individual through an alert mental discernment, or through intuitive appreciation, to realize what is fit and proper to do or say in any given situation. Tact, in those who possess it, enables the individual to avoid saying or doing things that would offend or disturb another and is based largely on a sensitiveness to the feelings and an insight into the motives of others.

As a crude example: On learning through a telephone conversation that Mrs. Van Astorbilt had lost a gold inlay, put in by your employer a few days ago, you would not step back of the chair and say to Doctor Blank, "That gold inlay you inserted in a right upper molar for Mrs. Van Astorbilt last week came out today, and she wants to see you

at once," because you are tactful, and you realize that the message conveyed in that manner would be offensive to Doctor Blank, and you appreciate also that the psychological influence upon Mrs. Walmot, who is in the chair having an inlay inserted, might be most unfavorable.

You would be most apt to say to Doctor Blank, "Mrs. Van Astorbilt is having some discomfort with one of her teeth and would like to know if you would arrange to see her before you leave the office."

Patience is that quality which enables one to endure interruption, interference, and disagreeable provocation with resignation. It enables us to come into personal contact with the faults and frailties of others without loss of temper, and is an indispensable attribute in any walk of life, but an asset of particular value to the young woman who has cast her lot in a dental office.

Calmness under stress of trying circumstances is always evidence of strength of character. It indicates that one has cultivated mental control which enables him to retain his composure, where the individual who has not cultivated self-control would show agitation and excitement and thus fall into an embarrassing situation.

Cheerfulness needs no advocate in any court. It is a quality that has made for success in the lives of men and women always. While it is not a primary essential in all walks of life, I should say that the individual who lacks at least a modicum of cheerfulness is distinctly handicapped.

And I would go so far as to say that a young woman lacking a reasonable degree of normal (not forced) cheerfulness would be a failure in a dental office. For even in these days of modern twentieth century scientific dentistry patients do sometimes come to us in distress, perturbation and apprehension.

A cheerful greeting from an attendant with a smiling face, who makes a friendly inquiry is certainly more pleasant to the tired patient who comes in after a night of pain, than a formal nod from a person so overwhelmed with the importance of her official status that she has no time to smile. The cheerful person is animated by good spirits and agreeable feelings toward others and that state of mind is apt to have a salutary influence upon others.

I would not wish to be considered pedantic in dwelling at some length upon the personal qualities enumerated above but feel sure you will agree that they all are important. However, if one should possess all the qualities mentioned and should lack that priceless desideratum of common sense it would be safe to prophesy only partial success or complete failure for that individual as an assistant in a busy dental office.

It is really quite difficult to explain just what we mean when we say common sense, because the meaning of it is so subtle and so far-reaching, but as I use the term in this connection, it means sound judgment and the ordinary ability to see things in their real light and to take things at their true value and also to have an appreciation of the "eternal fitness of things."

Assuming that a young woman has decided to become an assistant in a dental office and granted also that she possesses some, if not all, of the qualities we have discussed, there is certainly a favorable outlook for her success.

The position has many possibilities, and the right kind of a girl will not only fill her position in a routine manner, but she will bring to it a dignity which will command the respect of her employer

and the better element of his clientele. By faithful and thoughtful attention to the numerous details of her work and by loyal devotion to the interests of her employer she can make herself invaluable in his office.

This means that a young woman so situated is assured a permanent position at a good salary with working conditions usually less restricted and with a generous summer vacation in most instances. Working conditions should be less restricted, that is, she may have a little more freedom or more latitude in going or coming, and a great many do have.

We have not spoken of health, but of course it is recognized by all that success in the field of endeavor which we are discussing cannot come in the fullest measure to the girl who is weak and ailing and uncertain in her attendance at the office. It is essential, therefore, that office assistants should regulate their daily lives in such a manner as to build up and conserve their health, rather than to overdraw their reserve energies by late hours, irregular habits and injudicious eating.

Recreation is just as essential for the office assistant as it is for the dentist himself and is a matter that should receive serious consideration. But few of us have as much as we should but we can all have plenty of fresh air and some exercise and a normal diet if we will take it. Week-ends should give us some opportunity to build up our jaded energies if we do not misuse our time, and an occasional brief outing is essential to continued activity of the dentist and of his assistant as well.

It would be impracticable for me to endeavor to mention the many ways the assistant helps and eases the strain on the dental operator and indeed I doubt if I could mention them all even if I tried to do it. But every dentist who has a trained assistant will admit if he is frank about it that the hardest days of the year are those occasional days when his assistant is away from the office for one cause or another.

In many offices where the practice is large and active two or more attendants are employed, and this makes the absence of the senior assistant a little less of a trial when it does occur because the one next in line knows quite well what to do and how to do it.

It is quite natural that the dentist should expect his assistant to be prompt at all times and to be alert in anticipation of his needs, not only while assisting at the chair but in office activities in general.

It is my belief that the best results are obtained when the duties of the assistant are well defined and she understands just what is expected of her in routine matters. Then her gift of common sense comes into play when the unforseen or unexpected accident happens, and she has the right to expect from her employer a sympathetic co-operation, looking toward harmonious and efficient management of all duties. I mean just what I say in that connection. I have known occasions where a dentist expected so much that he did not get the efficiency he would ordinarily get, because he hadn't made clear his own wants.

If the assistant is expected to have all the personal qualities mentioned in the early part of this discourse then certainly it is even more essential that the dentist himself should possess them.

If he expects to gain from his office assistant her best effort and her most efficient help he must treat her with respect, with consideration and with a generous and sympathetic understanding. He must not expect her to be a superwoman; if she were she would not be working for him—she might be a dentist

herself and quite possibly a better one than her employer. He must realize that she is human and subject to human frailties of mind and body. Of course he must not overlook laxity, carelessness or mistakes, though the latter are bound to occur in the best regulated offices now and then. The employer can guide and direct the progress of an office assistant a great deal better by gentlemanly and kindly means than he can by harsh or brutal methods.

Nothing is gained by the dentist who berates and criticizes his assistant in the presence of his patient as I have seen done more than once. And as a matter of fact such procedure not only causes the assistant to suffer needless embarassment but it always reflects discredit upon the dentist himself in the eyes of any discerning patient.

When it is necessary to correct an assistant in the presence of a patient it may be done in a way that will produce the desired effect without embarrassment to the assistant, without annoyance to the patient and without loss of caste for the dentist. That is where a little tact may be of great help to all concerned. The employer who finds it necessary to find fault and nag his assistant constantly would better change and obtain one more to his liking or else do without, because inharmony and friction which is noticeable to patients is a disorganizing factor bound to act as a detriment to the practice.

In short a dentist who has a young woman in his employ should assist her in every way to learn her task and to become useful and efficient and then he should show to her the same respect and consideration that he would wish a man to show to his own sister or daughter.

The time has gone by when the dentist can develop a creditable practice and efficient office regime without the help of an office assistant, and I commend this field of activity to you and to young women looking for positions as being an occupation both dignified and useful which will yield remuneration commensurate with the service rendered.

Editorial Department

THE CODE OF ETHICS

Ever since the American Dental Association adopted a new Code of Ethics at the Los Angeles meeting, there has been much agitation over the matter, and a renewed interest in ethics from one end of the country to the other. This is a healthy indication of the desire on the part of the majority of the profession to maintain a dental Code and to insist that it be observed.

The Chairman of the Judicial Council has received many communications from different sections of the country asking for rulings on cases of infraction of the Code, which proves that the members are becoming more alert, and are making an earnest effort to suppress unethical methods. But there is one thing the members should understand—that the Judicial Council cannot enforce the provisions of the Code from Maine to California, or from Minnesota to Florida. This must be done by the local organizations themselves. When the House of Delegates at Los Angeles adopted the report of the Judicial Council which embodied the new Code, they thereby made it binding on every component body of the American Dental Association to see that their members lived up to the Code. Manifestly it would be impossible for the Judicial Council to accept the function of enforcing the Code.

Many of the members of the component societies wish to see the Code enforced, but they also wish to shift the responsibility for enforcing it on some one else. It cannot be done. The Judicial Council is willing at all times to give expression to its interpretation of the provisions of the Code, though even this should not be necessary. The Code was written with as great care, and its provisions were made as specific, as seemed possible at the time; and while the acknowledgment was made in the Council's Report that there were many phases of ethics which could not all be expressed in concrete terms, yet it was felt that the published Code was sufficiently specific for intelligent application. Let the members study this Code as published in the October, 1922 number of the *Journal of the American Dental Association*, and then apply it in the light of their best interpretation, and they will not go far amiss.

It has also been suggested to the Judicial Council that some new and rather drastic provisions should be introduced in the Code—pro-

visions which in the main are highly ethical and desirable—but it must be remembered that real reform is somewhat slow in its evolutionary development, and in order to be permanent it must not overreach. To push any reform too fast is usually to create a rebellion against it, and bringing about a reaction which frequently results in a setback, and the loss of much ground already won.

The goal to the highest ethical relationship which can be conceived of between men is set on a very lofty hill, and the climb up this hill is necessarily slow and laborious, with many devious curves and by-paths. The only way to pave the road up this hill and make it safe for travel is through the medium of education and not till we get the rank and file of the profession educated to the desirability of maintaining higher ethical standards can we hope to adopt and maintain a Code that will be ideal.

It is felt that a great forward step was taken at Los Angeles, and it now remains for our component societies to see that the present Code is made operable in its fullest sense, with the hope that some day we may have a better one.

IN MEMORIAM

Calvin S. Case, M.D., D.D.S., F.A.C.D.

Calvin S. Case, M.D., D.D.S., F.A.C.D., died Monday night, April 16, 1923, after an illness of several weeks, following an operation. He died as he had lived, sweetly and peacefully, at his home in Kenilworth, Illinois, and in the bosom of his family.

In the death of Calvin Case the world has lost a true benefactor, and medicine and dentistry have lost a true genius, but he left a fame which will endure through time; a record which must be a source of pride and comfort to his family and a legion of friends and worshipful admirers in whose hearts his memory will live and occupy a place which can never be filled to the end of time. What more could one wish for? What greater heritage could any one have?

Calvin Case was born in Jackson, Michigan, on April 24, 1847. He enlisted in the engineers corps and served his country in the Civil War, after which he became an apprentice in the dental office of Dr. Jerry Robinson, of Jackson, Michigan. In 1868 he married Miss Florence Baxter, of Jonesville, Michigan, and soon afterward enter the Ohio College of Dental Surgery at Cincinnati, from which institution he was graduated in 1871, being one of the first men from the great state of Michigan to graduate in dentistry.

After graduation he returned to Jackson and engaged in active practice, but not contented with the dental degree alone, he entered the medical department of the University of Michigan and received the medical degree in 1884. Following his graduation he served as Demonstrator of Anatomy for several years.

He remained in active practice in Jackson until 1889 when inspired with an ambition to seek broader fields for the display and exercise of his rapidly developing

talents, he came to Chicago and accepted the chair of prosthetic dentistry and orthodontia in the Chicago College of Dental Surgery. He held this chair until 1895 when he limited his practice and his teachings to the specialty of orthodontia in which field of effort he was a pioneer and in which he became the master.

His genius in teaching prosthetic dentistry and crown and bridgework, and his wonderful artistic attainments in painting word pictures and supplementing them with drawings upon the blackboard, commanded the admiration of all, and stamped him as a natural teacher. His heart, however, was in the broader field of service and helpfulness to disfigured and afflicted humanity, and in this field he had no peer. His work and his achievements in orthodontia were original and will live always; but his reputation and his fame were not gained easily. Many of his theories and teachings were opposed vigorously, but he was a student of biology, an artistic genius, a master mechanic, and a fighter, and he lived to see his teachings become respected and accepted by all.

His greatest work for afflicted humanity and his greatest achievements, however, were in the direction of the prosthetic correction of cleft palate. In this work his accomplishments were nothing short of wonderful, and no one can take his place. He made a study of phonetics, and was able to convey his scientific attainments in this direction to those whose unfortunate affliction made articulate speech impossible. He made an obturator which was self-sustaining and which restored the function of the soft palate, scientifically, and then he taught the wearer to speak and he never ceased until the patient spoke correctly.

Calvin Case was a true gentleman. His presence would grace any community. He was courteous, kind and affectionate. He was simple and sweet in his nature, sincere in his work, and loyal in his love and in his friendship.

He was a lover of nature and of birds, and had just completed the building of a Martin house to be raised on the spacious grounds of his beautiful home. He was an ardent devotee of all outdoor sports, and was active particularly in archery and tennis. In a National Archery Tournament held in Boston, he won second place in a field of seven hundred competitors.

Funeral services were held at his home in Kenilworth on Wednesday afternoon, April 18, at 3 o'clock. His closest personal friends and all of the ex-Presidents of the Chicago Dental Society acted as honorary pallbearers, and the active pallbearers were chosen from among the younger Chicago practitioners of the specialty of orthodontia.

In addition to the beautiful funeral rites of the Episcopal Church, an impressive oration was delivered by dentistry's most beloved representative—C. N. Johnson, after which interment took place at Graceland Cemetery.

His widow, Mrs. Florence B. Case, a daughter, Mrs. John Lind, and a son, Dr. Carl B. Case, survive.

The following is a copy of Dr. Johnson's address:

"My friends: I have been asked to do that for the deceased which I am sure he would willingly have done for me. I have been asked to say something at this time on behalf of the members of the profession which he loved so well. We have met to pay our tribute of love and loyalty, of comradeship and comfort, of hope and heartfelt homage.

"In the realm of what we call a human life, there is no throne like that of love, no scepter like that of loyalty.

"A man is remembered not so much by the fame he has won, not so much by the reputation he has made, not so much by the power he has wielded, or the place he

has attained in the affairs of the world. All of these sink to nothingness compared with the good he has done, and the friends he has made and kept.

"In the flotsam and jetsam of our experience, in the ebb and flow, in the ceaseless throb and beat of life, we test the souls of men in the alembic of their constancy and truth. Measured by this, the memory of our dear departed friend will linger long in the minds and hearts of his fellowmen.

"Nature was kind to Calvin Case. She endowed him with that wondrous wealth of skill and art which made of him the genius that he was. He waved the magic wand of hope across the deformed faces of little children, and wrought a miracle of symmetry and grace. He reached down into the nethermost depths of disfigurement and despair, and raised the hopeless one into the dawning of a better day. He brought joy into the darkened home of many a morbid child, and lightened up the latter days of many a mother's heart.

"He caused the sad to smile, the dumb to speak, and the despondent to turn their faces toward the glowing light.

"Calvin Case was a benefactor to his race, and on into the dim and distant future of the days to come, his name and fame will travel far and wide wherever the mouths of children are deformed, and mothers' hearts are sad.

"We, his friends, have come today to lay our laurel wreath of love beside his sacred form.

"We commit back to the elements whence it came all that is mortal of our beloved friend. We carry in our hearts the real and true—the memory of loving deeds and cherished hours—of cheer, and hope, and helpfulness, and happiness—all there is of goodness and grandeur, of love and light, between the dawn of human day, and the night that we call death."

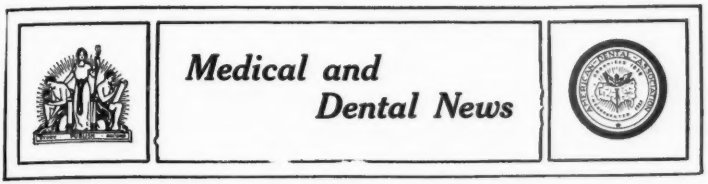
William N. Klumb.

William N. Klumb, who for the past twenty-six years practiced dentistry in the village of Kewaskum, Wisconsin, passed away in this city, April 30, 1923. Dr. Klumb was born in the town of Jackson on April 12, 1875, and came to West Bend in 1891 and graduated from the local high school in 1893. He then entered the Northwestern University of Chicago and took the dental course, graduating in 1897. After graduation he opened a dental office in the village of Kewaskum and continued his practice in that village until illness prevented him from continuing.

Dr. Klumb was a princely man—honest, upright, industrious and always well-beloved, and he had many warm personal friends. His every act in life was above reproach, and his death has brought sadness to all who had the good fortune of knowing him as a friend. He was a loving son and a kind and considerate brother, and his immediate relatives feel their loss keenly. Our sincere and heartfelt sympathy to them.

Charles Godon.

A cablegram received May 21, announces the death of Dr. Charles Godon, a distinguished dentist of Paris, France.



ARKANSAS

"Correcting Physical Defects of Rural School Children." By Elsie Paisley, R. C. Nurse of Saline County, Arkansas.—Public Health Nurse, Cleveland, April, 1923.

CALIFORNIA

Californians Learn Value of Mouth Hygiene: Instruction was given to 418,693 children and adults on the proper care of the mouth during the last eighteen months by the Division of Mouth Hygiene, California State Board of Health.

Of these 57,193 were children, and approximately 10,000 were adults. The Division's films reached 7,500. Its literature on "The Care of the Teeth" was distributed among 20,000 school children and adults. Its exhibits reached approximately 320,000 during the last three months. Dental examinations have been made of 4,000 school children, and records of the conditions found, filed for statistical information.

Of the fifty-eight counties in the state fifty-two have received assistance from this department, outside of the regular visits and programs conducted in the field. Forty counties have been visited. In most of these counties, oral hygiene programs were conducted. And as a result, nearly half are already working on definite programs to provide dental service for school children. As a further result of the department's activities, fifteen counties are asking for dental hygienists, and it is hoped that these counties will be provided for in the fall.

When the Division of Dental Hygiene began its work, two-thirds of the dental hygienists (nineteen in total number) were working either in private offices or in the United States Public Health Service. Now, the reverse is true. Seven counties have taken over a number of these dental hygienists in their school work. These counties are: Contra Costa, Alameda, San Francisco, Merced, Fresno, Kern and Los Angeles.

IOWA

The Rockefeller Foundation has given $22,500 to the Child Welfare Research Station of the State University of Iowa, of which Professor Bird T. Baldwin is director. The sum will be paid in three yearly installments.—Journal American Medical Association, Chicago, March 31, 1923.

KENTUCKY

"Child Welfare in Kentucky": A series of thirteen four-minute addresses prepared by experts on various phases of child-welfare work, at the request of the Kentucky Sunday School Association, to be given by radio. They appear under this title in pamphlet form, with supplementary references for the use of Sunday School classes.—Published by the Kentucky Sunday School Association, Miss Frances Ingram, Louisville, Editor.

MASSACHUSETTS

"Health Equipment in Framingham—Then and Now." by Donald B. Armstrong, M.D., Executive Officer, and A. K. Stone, M.D., Administrative Director, Framingham, Mass.

An account of the changes in the machinery for combating tuberculosis made in Framingham during the six years since the community health and tuberculosis demonstration was undertaken in that city by the National Tuberculosis Association and the Metropolitan Life Insurance Company. Tuberculosis has decreased 55 per cent and the general death rate 16 per cent since 1917. Almost the entire

program of the demonstration has been assumed by the local community, to be continued by it permanently.—Nation's Health, Chicago, March, 1923.

GENERAL

Rochester Dental Dispensary Budget

Disbursements

	Expended 1921	Estimated 1922
Dental	$33,068.28	$34,000.00
Extracting	3,446.12	3,500.00
Orthodontia	7,668.28	9,000.00
X-ray	1,386.92	500.00
Surgical	10,530.50	12,000.00
Clinics and lectures	100.00	250.00
Library	23.00	25.00
Office	542.56	900.00
Building	653.72	800.00
General	35,621.91	40,000.00
Kenilworth Terrace	164.90	600.00
	$93,606.19	$101,575.00

Rochester Dental Dispensary Financial Statement

Disbursements

	1920	1921
Dental	$20,656.88	$33,068.28
Extracting	2,754.63	3,446.12
Orthodontia	4,795.14	7,668.28
X-ray	95.67	1,386.92
Surgical	23,692.44	10,530.50
Clinics and lectures		100.00
Library	20.63	23.00
Office	929.36	942.56
Building	175.33	653.72
General	32,229.03	35,621.91
Kenilworth Terrace	283.26	164.90
	$89,632.37	$93,606.19
School Account—		
Hygienists & public schools, salaries and supplies	$25,546.58	$28,765.47
	$115,178.95	$122,371.66

REPORT OF WORK DONE BY ROCHESTER DENTAL DISPENSARY

1922

	Jan.	Feb.	March	April	May	June	July	Aug.*	Sept.	Oct.	Nov.
Number of visits	5,456	5,330	7,090	5,530	5,898	4,900	3,822	2,782	4,646	6,186	6,925
Tooth treatments	286	270	417	288	214	256	175	128	247	400	390
Root treatments	165	126	122	121	139	120	82	45	74	109	152
Gum treatments	173	304	304	261	220	215	123	40	151	219	180
Sil. nitrate treatments	898	890	1,046	977	750	710	534	448	1,106	1,338	987
Orthodontia treatments	634	615	802	766	960	723	653	733	689	955	863
Prophylactic treatments	159	150	183	147	179	100	85	39	87	119	99
Abscess treatments	13	23	35	20	33	28	4	7	20	32	29
Root fillings	66	92	73	95	86	52	46	9	43	60	68
Amalgam fillings	1,987	2,050	3,076	2,406	2,248	1,907	1,310	793	1,388	2,103	2,801
Synthetic fillings	220	194	149	131	149	126	102	82	156	205	154
Guttapercha fillings	171	191	163	166	150	150	132	81	144	180	177
X-rays	144	102	152	157	160	104	113	74	118	244	333
Root extractions	199	213	256	168	149	102	53	39	147	202	155
Tooth extractions	1,105	1,140	1,689	1,210	1,441	1,019	673	507	668	1,589	1,425
Inlays	6	9	7	3	3	3	12	3	6	4	1
Pulps devitalized	45	36	72	62	69	37	46	24	54	73	69
Pulp pressure	2	4	4	8	....	5	5	1	2	13	27
Pulps capped	41	45	41	42	17	25	16	28	48	69	78
Crowns	3	4	1	2	1	3	9	1	....	3	6
Plates	2	3	7	4	1	4	....	....	1	2	1
Bridge	....	1	....	....	....	....	....	....	....	....	....
Number of visits	5,456	5,330	7,090	5,530	5,898	4,900	3,822	2,782	4,646	6,186	6,925
Number of patients paid 5¢ a visit	4,656	4,598	6,041	4,707	5,071	4,275	3,271	2,388	3,921	5,236	5,917
Dismissals	585	745	1,150	803	902	842	775	381	829	1,082	973
Number of children lectured in schools	6,146	7,114	8,421	5,489	2,493	.....	.....	.....	3,052	6,395	7,479
Tonsil-adenoid operations	131	156	181	141	172	159	154	22	139	150	164

Number of visits to Dispensary from Oct. 15, 1917, to Dec. 1, 1922 268,269

Total tonsil-adenoid operations to December 1, 1922 5,209

* Closed for two weeks' vacation.

Forsyth Dental Infirmary for Children: The volume of clinical work is only a very small part of the real work accomplished by the Forsyth Dental Infirmary during its eight years of operation.

While not primarily a public educational institution, its chief work is with the public dental health, and during its operation dental prevention has become a real issue.

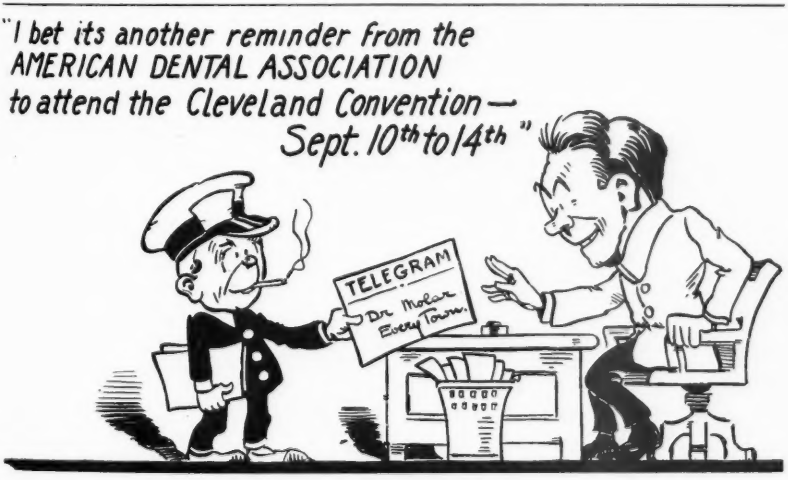
While a great deal of clinical work has been done, it has merely been a means to an end to permit the working of an underlying policy of prevention. This is shown more definitely in the reduction of the age of initial treatment which has dropped during this period from 13.6 to 6 years. The policy by which the work has been done is to gradually approach a time or an age when real preventive work can be done. This process is naturally slow, but has been kept constantly in mind from the beginning and every type of reparative dentistry arranged to assist in reaching the goal. Even today it is impossible to obtain any great interest from the public in dental matters before the child has a tooth present, whereas this time is really too late to lay the proper foundation of true preventive dentistry.

The general underlying policy of the conduct of the Forsyth Clinic has and is to do enough curative work to keep its staff busy in alleviating the ills of children who have not had the opportunity of a good dental prenatal foundation and simultaneously to approach as rapidly as possible to the real period of prevention, the prenatal stage, and two years after birth.

The following is the clinical statement of Forsyth Dental Infirmary, for eight years, 1915-1922 inclusive:

Total Registration	122,026
Total Visits to Infirmary	640,944
Total Operations	1,877,656
Total Fillings	860,610
Total Canal Treatments	139,178
Completed Cases, Dental, Nose and Throat	102,550
Nose and Throat Examination	36,491
Adenoids and Tonsil Operations	5,783
Oral Surgery Operations	246
Anesthesia Cases, Extracting	110,011
Total No. Extractions	296,077
Temporary Teeth	245,164
6th Year Molars	47,637
No. Dental Prophylaxis Treatments	197,724
No. Buttons a/c Clean Teeth	11,658
No. Class Certificates "All Dental Work Completed"	1,106
Children Attending Clinic with Clean Teeth, per cent	88
Average Age 1915, years	13.5
Average Age 1922, years	6.5
The following statement is for the years 1921 to 1922:	
No. of Pupils Receiving Prophylactic Treatment	45,031
No. of Pupils in "Entire Classes" Treated	7,560
Total Number of "All Dental Work Completed"	39,774
947 Classes	

—The Dental Hygiene News Letter, December, 1922.


"I bet its another reminder from the AMERICAN DENTAL ASSOCIATION to attend the Cleveland Convention— Sept. 10th to 14th"
TELEGRAM
Dr Molar
Every Town

Announcements

CALENDAR OF MEETINGS

NATIONAL SOCIETIES

American Dental Association, September 10-14, 1923, Cleveland, Ohio.

American Medical Association, June 25 to 29, 1923, San Francisco, California.

American Academy of Periodontology, September 7 and 8, 1923, Statler Hotel, Cleveland, Ohio.

American Society of Oral Surgeons and Exodontists, September 4 to 7, 1923, Cleveland, Ohio.

American Dental Society of Europe, August 1, 2, 3 and 4, 1923, Paris, France.

American Society of Dental Radiographers, September 7 and 8, 1923, Cleveland, Ohio.

American College of Surgeons, October 22 to 26, 1923, Congress Hotel, Chicago, Illinois.

Congress of Anesthetists, October 22 to 24, 1923, Auditorium Hotel, Chicago, Illinois.

National Board of Dental Examiners, September 10 and 11, Lattice Room, Hotel Statler, Cleveland, Ohio.

National Society of Denture Prosthetists, August 27 to September 8, 1923, Cleveland, Ohio.

Research Commission of the American Dental Association, September 8, at 10 A. M. and 8:30 P. M., Hollenden Hotel, Cleveland, Ohio.

Xi Psi Phi, September 7 and 8, 1923, Cleveland, Ohio. Headquarters, Winton Hotel.

STATE SOCIETIES

National Capital, first Tuesday of every month.

June

California, at San Francisco (11-15).
Colorado, at Troutdale-in-the-pines, (14, 15, 16).
Idaho, at Boise.
Maine, at Augusta, (26, 27, 28).
New Hampshire, at The Weirs (21, 22).
New Mexico, at Albuquerque (18, 19, 20).
South Carolina, at Columbia (26, 27, 28).
Southern California, at Los Angeles (18, 19, 20).
Utah, at Salt Lake City (27, 28, 29, 30).
Washington, at Walla Walla (11, 12, 13).
Wyoming, at Laramie (19, 20, 21).

July

Montana, at Missoula (19, 20, 21).
Wisconsin, at Milwaukee (10, 11, 12).

September

Delaware, at Wilmington (12).

November

Arizona, at Chandler (2, 3).
Georgia, at Athens (7, 8, 9).

MEETINGS OF STATE BOARD OF DENTAL EXAMINERS

Alabama, at Birmingham Dental College, Birmingham, June 20. Secretary-Treasurer, H. C. Hassell, 616—22nd Avenue, Tuscaloosa, Alabama.

Arkansas, at Arlington Hotel, Hot Springs, July 9, 10 and 11. Secretary, H. J. Crume, Wilson Building, El Dorado, Arkansas.

Colorado, at Denver, first Tuesdays of June and December. Secretary, Wm. H. Flint, Littleton, Colorado.

Connecticut, at Hartford, June 21, 22 and 23. Recorder, Arthur B. Holmes, 63 Bank Street, Waterbury, Connecticut.

Delaware, at Municipal Building, 10th and King Streets, Wilmington, June 20 and 21. W. S. P. Combs, Middletown, Delaware.

District of Columbia, June 18 to 22. Secretary, W. M. Simkins, 720 Woodward Building, Washington, D. C.

Florida, at Jacksonville, June 27, 28, 29 and 30. R. P. Taylor, 414 St. James Bldg., Jacksonville, Florida.

Illinois, at Room 1006 City Hall, 1007 County Building, Chicago, June 19, 20, 21, 22 and November 13, 14, 15, 16.

Indiana, at State House, Indianapolis, June 11 to 16 inclusive. Secretary, H. C. McKitt-

rick, 1006 I.O.O.F. Building, Indianapolis, Indiana.

Kansas, at Wichita, June 18 to 23. Secretary, G. F. Ambrose, El Dorado, Kansas.

Kentucky, at Louisville, June 11. Secretary J. H. Baldwin, 908 Francis Building, Louisville, Kentucky.

Maine, at State House, Augusta, June 28, 29 and 30. Secretary, Henry Gilman, 192 State Street, Portland, Maine.

Massachusetts, at —, June 19, 20, 21, 22, 23, 25, 26, 27 and 28. Secretary, J. N. Carriere, 146 State House, Boston, Massachusetts.

Michigan, at Dental College, Ann Arbor, June 11 to 16 inclusive. Secretary, B. S. Southerland, 401 Ward Building, Owosso, Michigan.

Minnesota, at University of Minnesota College of Dentistry, Minneapolis, June 22 to 30 inclusive. Secretary-Treasurer, R. B. Wilson, 1133 Lowry Building, St. Paul, Minnesota.

Mississippi, at Capitol Building, Jackson, June 19. Secretary, B. J. Marshall, 6-7 Turner-Cox Building, Marks, Mississippi.

Missouri, at St. Louis, June 8, 9, 11 and 12. George E. Haigh, Jefferson City, Missouri.

Montana, at Helena, July 9 to 12 inclusive. Marshall A. Gates, Helena, Montana.

Nevada, at Reno, June 18 to 23. Secretary, G. H. Marven, P. O. Box 56, Reno, Nevada.

New Jersey, at Trenton, June 25 to 29. Secretary, John C. Forsyth, 429 E. State Street, Trenton, New Jersey.

New Mexico, at Albuquerque, June 21, 22 and 23. Clarence C. Clarke, Socorro, New Mexico.

New York, at Albany, June 25 to 28 and September 24 to 27. Minor J. Terry, Albany, New York.

North Carolina, at Raleigh, June 14. Secretary, F. L. Hunt, Asheville, North Carolina.

North Dakota, at Fargo, July 10, 11 and 12. Secretary, Galon Crum, 73 Edwards Building, Fargo, North Dakota.

Ohio, at Dental Department, Ohio State University, Columbus, June 25 to 29. Secretary, Ray R. Smith, 327 E. State Street, Columbus, Ohio.

Oklahoma, at State Capitol Building, Oklahoma City, June 26 to 29 inclusive. Secretary L. M. Doss, 245 American National Bank Building, Oklahoma City, Oklahoma.

Pennsylvania, at Pittsburgh and Philadelphia, June 20, 21, 22 and 23. Secretary, Alexander H. Reynolds, 4630 Chester Avenue, Philadelphia, Pennsylvania.

Rhode Island, at State House, Providence, June 26, 27 and 28. Secretary, Albert L. Midgley, 315 Butler Exchange, Providence, Rhode Island.

South Carolina, at The Jefferson Hotel, Columbia, June 22 and 23. Secretary, W. K. Walker, P. O. Box 714, Orangeburg, South Carolina.

South Dakota, at Sioux Falls, June 25. Secretary, L. R. Walston, Redfield, South Dakota.

Tennessee, at Vanderbilt School of Dentistry, Nashville, June 18. Secretary-Treasurer, F. W. Meacham, 911 Hamilton National Bank Building, Chattanooga, Tennessee.

Texas, at Dallas, June 18 to 21 inclusive. Secretary, R. L. Rogers, Amarillo, Texas.

Utah, at —, July 9 to 14. S. S. Burnham, 721 Boston Building, Salt Lake City, Utah.

Vermont, at Montpelier, June 25, 26 and 27. H. F. Hamilton, Newport, Vermont.

Virginia, at Medical College of Virginia, Richmond, June 12, Secretary, J. P. Stiff, Fredericksburg, Virginia.

Washington, at Walla Walla, June 13. Director, Fred J. Dibble, Department of Licenses, Olympia, Washington.

West Virginia, at Huntington, June 26. Secretary, R. Mason Hite, Mannington, West Virginia.

Wisconsin, at Milwaukee, June 25 to 29 inclusive. Secretary, J. L. Blish, Fond du Lac, Wisconsin.

Wyoming, at Cheyenne, June 26, 27 and 28. Secretary, T. J. Ice, Powell, Wyoming.

RAILROAD RATES TO THE CLEVELAND MEETING

All railroads in the United States and Canada will sell round-trip tickets at one and one-half fare, on the "Identification Certificate Plan," instead of the "Certificate Plan" used heretofore.

One of these Identification Certificates, with instructions, will be mailed to each member of the American Dental Association in ample time for the meeting.

D. C. BACON,
Chairman Transportation Committee.

MONTANA STATE DENTAL SOCIETY MEETING

The twentieth annual meeting of the Montana State Dental Society will be held in Missoula, July 19, 20 and 21. A cordial invitation is extended to all members of recognized societies.

J. E. BAKER, *Secretary-Treasurer,*
311 Ford Bldg., Great Falls, Montana.

SOUTH CAROLINA STATE DENTAL ASSOCIATION

The South Carolina State Dental Association will hold its next meeting in Columbia, South Carolina, June 26, 27 and 28, 1923.

E. C. DYE, *Secretary*,
Greenville, S. C.

NATIONAL BOARD OF DENTAL EXAMINERS

The National Board of Dental Examiners will meet in the Lattice Room, Hotel Statler, Cleveland, Monday and Tuesday, September 10 and 11.

H. C. MCKITTRICK, *Secretary*,
1006 I.O.O.F. Bldg.,
Indianapolis, Indiana.

DELAWARE STATE BOARD OF DENTAL EXAMINERS

The next meeting of the Delaware Board of Dental Examiners will be held in Wilmington, June 20 and 21, 9 a. m. to 5 p. m., Municipal Building, 10th and King Streets. For further information, address

W. S. P. COMBS, *Secretary*,
Middletown, Delaware.

DISTRICT OF COLUMBIA BOARD OF DENTAL EXAMINERS

The next meeting of the Board of Dental Examiners of the District of Columbia will be held June 18 to 22. Details may be had by addressing

W. M. SIMKINS, *Secretary*,
720 Woodward Building, Washington, D. C.

RHODE ISLAND STATE BOARD

The regular semi-annual meeting of the Rhode Island Board of Registration in Dentistry for the examination of applicants will be held in the State House, Providence, Rhode Island, June 26, 27 and 28, 1923. All applications with proper fee must be filed one week previously.

For further information, address

ALBERT L. MIDGLEY, *Secretary*,
315 Butler Exchange, Providence, R. I.

NEW YORK COLLEGE OF DENTISTRY ALUMNI MEETING

Alumni Day at the New York College of Dentistry will be held Wednesday, June 13, 1923. The college will keep "open house" and clinics will be conducted all day by the alumni.

The Alumni Dinner will be given in the Grand Ball Room, Hotel Commodore at 7 P. M. Speakers of national reputation have been invited to aid in this drive for an enlarged and rejuvenated alumni association.

FREDERICK LESTER STANTON,
Secretary Dinner Committee,
New York College of Dentistry, 209 E. 23rd St.

AMERICAN ACADEMY OF PERIODONTOLOGY

The Tenth Annual Meeting of the American Academy of Periodontology will be held in the Hotel Statler, Cleveland, Ohio, September 7 and 8, 1923. An invitation is extended to all those interested in periodontia to meet with us.

J. HERBERT HOOD, *Secretary*,
624 Hanna Bldg., Cleveland, Ohio.

AMERICAN DENTAL GOLF ASSOCIATION

The fourth annual tournament of the American Dental Golf Association will be held in Cleveland, Monday, September 10, 1923. A banquet will be held Sunday, September 9, in the "Rainbow Room," Winton Hotel.

Many events are planned, prizes donated and the usual fellowship anticipated.

Make reservations now and for any particulars communicate with

J. A. LOUGHRY, *Sec.-Treas.*,
1311 Schofield Bldg.,
Cleveland, Ohio.

NORTHWESTERN UNIVERSITY ALUMNI CLINIC

The Annual Alumni Clinic of the Northwestern University Dental School will be held June 14 and 15, 1923, at 31 W. Lake Street, Chicago, Illinois.

WILLIAM DEVLIN, *Secretary*,
25 E. Washington, St.,
Chicago, Illinois.

PROGRAM OF FEDERATION DENTAIRE INTERNATIONALE (F.D.I.)

SIXTEENTH SESSION—PARIS, FRANCE, AUGUST 6-9, 1923

MONDAY, AUGUST 6

9:30 a. m. Opening Session.

ORDER OF THE DAY

1. President's Address.
2. Roll Call of Nations and Responses of Delegates or Representatives of National Associations.

3. Delivery of the Miller Prize awarded in 1922 to Dr. J. Howard Mummery (London).

11:00 a. m. Meeting of Executive Council.

ORDER OF THE DAY

1. Report of the Secretary-General.
2. Report of the Treasurer.
3. Revision of the alterations of rules made in 1914 at the London meeting.
4. Preliminary organization of the International Dental Congress, Philadelphia, 1926.

2:30 Opening Session of the Commissions.

1. Commission on Education.
2. Commission on Legislation and Deontology.
3. Commission on Red Cross.
4. Commission on Documentation (Statistics, bibliography).
5. Commission on Dental Press.

5:00 p. m. Meeting of Executive Council.

1. Dr. Aguilar's Report on Russian Relief Fund.
2. Annual international directory of all dental societies and dentists holding diplomas.
3. Report on bibliography.
4. International Code of Ethics.
5. Nominations of candidates for Miller Prize.
6. Awarding of the Miller Prize for 1924.

TUESDAY, AUGUST 7

9:00 a. m. Meeting of the Commissions.

1. Commission on Scientific Research.
2. Commission on Dental Hygiene.
3. Commission on Army and Navy.
4. Commission on Terminology and Nomenclature.

2:00 p. m. Meeting of the Commissions.

1. Commission on Education.
2. Commission on Legislation and Deontology.
3. Commission on Red Cross.
4. Commission on Documentation.
5. Commission on Dental Press.

4:30 p. m. Meeting of Executive Council.

1. Order of the Day continues—Unfinished Business.
2. Report of the Trustees of the Miller Prize Fund.
3. Report of Commissions.
   Report on Legislation and Deontology.
   Report on Red Cross.
   Report on Documentation.
   Report on Dental Press.
4. Discussion and Action on Reports.

WEDNESDAY, AUGUST 8

9:00 a. m. Meeting of the Commissions.

1. Commission on Education.
   Scientific Research (Joint Session).
2. Commission on Dental Hygiene.
3. Commission on Army and Navy.

2:00 p. m. Meeting of the Commissions.

1. Commission on Scientific Research.
   Dental Hygiene (Joint Session).
2. Commission on Army and Navy.
3. Commission on Terminology and Nomenclature.

3:00 p. m. Meeting of Executive Council.

1. Order of the Day continued—Unfinished Business.
2. Reports of Commissions.
   Commission on Education.
   Commission on Scientific Research.
   Commission on Dental Hygiene.
   Commission on Army and Navy.
   Commission on Terminology and Nomenclature.
3. Report of Treasurer.
4. Discussion and Action on Reports.
5. Election of members to F. D. I. (societies and individuals).
6. Selection of place and date for meeting of F. D. I. in 1924.
7. Discussion of the recommendations and resolutions submitted.
8. Various proposals.
9. President's Address.
10. Closing of the Session.

8:00 p. m. Banquet of the F. D. I.

THURSDAY, AUGUST 9

Excursion for members of the F. D. I. and families, starting from Paris in the morning and returning in the evening.

DENTAL ALUMNI SOCIETY, UNIVERSITY OF PENNSYLVANIA

The forty-third annual meeting of the Dental Alumni Society, University of Pennsylvania, will be held in the lecture room of the Thomas W. Evans Museum and Dental Institute, Fortieth and Spruce Streets, Philadelphia on Friday, June 15, 1923 at 10 A. M.

Clinics will be given in the main operating room from 2 to 5 P. M. The annual banquet of the society will be held in the Hotel Adelphia, Gold Room, June 15, at 6:30 P. M. Subscription fee, $3.50. Send remittance to Dr. Frederick W. Allen, Flanders Building, Philadelphia, Pennsylvania.

REUNIONS

Class of 1888, Dr. Luther M. Weaver, Chairman, 7103 Woodland Ave., Philadelphia, Pennsylvania.

Class of 1898, Dr. Alexander H. Reynolds,

Chairman, 4630 Chester Ave., Philadelphia, Pennsylvania.

Class of 1903, Dr. E. R. Sausser, Chairman, S. E. Cor. 15th & Locust, Philadelphia, Pennsylvania.

Class of 1908, Dr. W. E. Thompson, Chairman, 4621 Lancaster Ave., Philadelphia, Pennsylvania.

Class of 1913, Dr. Merritt E. Brown, Chairman, 211 Arkay Bldg., Albany, New York.

Class of 1918, Dr. R. H. Gilhooly, Chairman, 11 Broadway, New York City, New York.

ALUMNI DAY, JUNE 16, 1923

2 P. M. Assemble in Quadrangle and march to Franklin Field to be reviewed by the Provost, Vice-Provost and members of the faculty.

3 P. M. Baseball game between Lafayette and the University of Pennsylvania. Ladies and friends of graduates invited to attend. Admission free.

5 P. M. Play in the Botanical Gardens. Admission free.

6:30 P. M. Collation served in the Triangle.

8 P. M. Performance by the Mask and Wig Club in Triangle.

For further information, address

Z. T. JACKAWAY, *Secretary-Treasurer*,
1506 E. Susquehanna Ave., Philadelphia, Pa.

RESOLUTIONS ON DEATH OF CALVIN S. CASE

Dr. C. N. Johnson, at a meeting of the Chicago Dental Society, held April 17, 1923, presented the following resolutions which were unanimously adopted:

WHEREAS, the members of the Chicago Dental Society having learned of the passing of one of its most distinguished and beloved colleagues, Dr. Calvin S. Case, and

WHEREAS, his many years of service to the profession and people in his chosen specialty had made his name synonymous with all that was progressive and scientific in its practice; and

WHEREAS, his sterling character and charming personality had endeared him to an ever widening circle of friends; therefore, be it

Resolved, That the Chicago Dental Society, in session assembled, wishes to place on record its appreciation of his outstanding ability and his many contributions to the science and art of dentistry and his generous helpfulness to those who sought his professional aid; also, be it

Resolved, That we give expression to our gratitude for the privilege of having labored with him for so many years and our profound sorrow that he has been taken from our midst.

NEW BOOKS RECEIVED FOR THE LIBRARY OF THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

The Journal of the American Dental Association promptly acknowledges here the receipt of new publications. Books selected from those named on this list are reviewed below. Reviews are matter-of-fact statements of the nature and contents of the publications referred to and are intended *solely to guide possible purchasers.*

Metals and Their Alloys. Charles Vickers, Non-Ferrous Editor of Foundry and Metallurgical Editor of Brass World. A modern, practical work dealing with metals from their origin to their useful application—both individually and as parts of alloys—used where strength, ductility, toughness, lightness, color, hardness, cheapness, conductivity, or bearing properties are demanded. Illustrated by one hundred and ten engravings. Publishers: Henry Carey Baird & Co., Inc., 2 W. 45th St., New York. Price $7.50.

A Manual of Dental Anatomy. Sir Charles S. Tomes, Kt., LL.D., F.R.S., F.R.C.S., Eighth Edition. Edited by H. W. Marett Tims, O.B.E., (Mil.) M.A. (Cantab.), M.D., M.Ch. (Edin), F.R.A.I., F.Z.S., with the assistance of C. Bowdler Henry, L.R.C.P. (Lond.), M.R.C.S., L.D.S. (Eng.) Publishers: The MacMillan Company, New York, 325 illustrations.

Dental and Maxillary Roentgenograms. Robert H. Ivy, M.D., D.D.S., F.A.C.S., Lt. Colonel, Medical Reserve Corps, U. S. Army, and LeRoy M. Ennis, D.D.S., Captain, Dental Reserve Corps, U. S. Army. Second Edition, Revised and Enlarged, with 403 illustrations. Publishers: C. V. Mosby Company, 508 No. Grand Avenue, St. Louis, U. S. A. Price $4.00.

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